Telephony.

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Real Facts Are Necessary to Both Sides in Rate Contests

That old saying, "Knowledge is power," may be hoary with age, but it is still 100 per cent true. And never more true than today when the business road is full of ruts and the going is difficult for nearly everybody.

As a matter of fact, the truth of the old adage is again fully proved because the going is easier for those who have the "knowledge"—meaning the facts about their business and the information required to cope with present day conditions.

That is what the telephone industry is finding out these times. The telephone company equipped with the facts—and making use of them—is the one that is successfully meeting that awkward situation which arises when their subscribers ask the question: "When are telephone rates coming down along with other prices?"

It is an embarrassing question when the telephone company hasn't the facts with which to answer.

* * * *

On the other hand it is not an altogether pleasant situation for the subscribers who peremptorily demand that rates be reduced without knowing the facts—that is, without knowing whether or not the company is financially able to reduce rates without seriously crippling the service. In most cases those who demand rate cuts do not see the other side of the question. All they are interested in is to reduce their telephone bills, for they seldom think of the company's side of the case.

Probably it is only fair to say that, if they did understand that a rate cut would impair the service and cripple the company, they would not push the demand, for after all the small amount of money involved would mean little to the individual telephone user. To the company, however, it might easily mean disaster.

For that reason the subscribers also should have "knowledge" before urging a reduction in rates.

* * * *

In this connection a case reported from Nebraska presents interesting circumstances. At York, in that state, a group of telephone subscribers met at the courthouse and adopted resolutions demanding that the Lincoln Telephone & Telegraph Co. reduce its rates 25 per cent. No evidence was offered to show that the facts justified such a cut or that the company could afford to grant it. It was just the hasty, one-sided view of a group that saw only one thing—a rate reduction.

One newspaper in that district—the Geneva Signal—had the courage to denounce such blind action and advise the petitioners to inquire into the facts before "resoluting." The arguments advanced apply to similar cases all over the country, and hit the nail so squarely on the head that they are quoted in part:

We don't know a thing about the profit the Lincoln Telephone & Telegraph Co. is making. If it is anything like 25 per cent we would be astonished to see the fact proved. We read three newspaper accounts of the meeting and none of them suggested the thought that the men who adopted the resolutions had made any attempt to find out whether the telephone company could cut its rates 25 per cent, or any other per cent, without going into bankruptcy.

A telephone company, broadly speaking, has just one source of revenue—the service it sells to its customers. To maintain the service acceptably while cutting its income 25 per cent would be a grave undertaking, unless its profits are gigantic. Common sense leads one to the belief that the telephone company has lost heavily in long distance tolls in the past year or two and may have had other losses. We do not see how a sensible conclusion about rate-cutting could be reached without at least a little investigation.

Every such company does a large per cent of its business with borrowed money. It is within the knowledge of most of us that hundreds, possibly thousands, of the customers of the Lincoln company have invested their savings in stock and are depending upon the income from that source for a portion of their living. These people have a right to be considered.

We have never heard it charged that any employe of the Lincoln company is overpaid. The meeting at York followed one of the most disastrous storms in the history of this part of the state, a storm that mowed down telephone poles and wires over three or more counties and portions of other counties, causing tremendous losses to all of the wire companies. It was an inopportune time to demand a 25 per cent cut in the income of a company so seriously affected in service and in destruction of its property.

The promoters of the York meeting proposed to interest the people of other counties, which makes the matter of local in-

terest. The Signal would be glad to have cheaper telephone service, but it doesn't expect to get it through the passage of resolutions that seem to be based entirely upon the wishes of those making them. To have weight with thinking people, resolutions should be based upon proved facts and deductions properly made from them."

Coming back to the importance of the company being fortified with information to answer such demands for rate reductions, it is gratifying to note that service companies are waking up to the need of showing the public the facts. Usually the questions run something like this:

"Other prices have come down—food, clothing and rents—but not my telephone bills. Why should the telephone company be different from the rest? What makes the telephone company the exception? Why don't you reduce your rates?"

Nobody can deny that these are natural questions under present conditions, and that the public is entitled to adequate replies. It is up to the company to supply the necessary information and instruct their employes to be ready to give the right answers.

* * * *

An effective explanation of why the telephone business is different from any other business—and why, therefore, rates cannot follow the trend of general prices—is contained in a booklet issued by the Bell Telephone Co. of Pennsylvania, for use of its employes in answering such questions. Its title is, "As a Telephone System Grows." Like a primer, it tells the facts in short words and simple drawings that nobody can fail to understand. Comparison of the automobile and telephone businesses, for instance, runs as follows:

"Here is an automobile. You use it to go from one place to another. If it were the only automobile in the world it would be just as useful. As the number of cars increases, the usefulness of your car becomes no greater.

Here is a telephone. You use it to talk from one place to another. If it were the only telephone in the world, it would be worth absolutely nothing. As the number of telephones increases, your telephone grows in usefulness."

* * * *

The story goes on to tell of telephone service reaching out to friends, to the drug store, the doctor, the laundress, etc., each of whom makes his telephone more useful to the subscriber, and the conclusion is: "Telephone service is different from any other commodity. Its usefulness increases as the number of telephones increases."

The booklet proceeds to show that while the service becomes more valuable to the user as the system grows, the company's expenses increase, as volume does not mean less cost to the company. More telephones mean more plant investment per station. The point is also stressed that the telephone business is a retail business, and that telephone calls cannot be turned out on the "mass production" economy plan of other industries.

* * * *

Distribution of such information to the public will lead to better understanding of the telephone company's problems. It is the task of telephone employes to absorb the facts themselves and be able to tell subscribers effectively why rates cannot follow the general price trends.

COMING CONVENTIONS.

Minnesota Telephone Association, Radisson Hotel, Minneapolis, January 26, 27 and 28.

Nebraska Telephone Association, Hotel Paxton, Omaha, February 9, 10 and 11.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, February 24, 25 and 26.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 12, 13 and 14.

Kansas Telephone Association, Jayhawk Hotel, Topeka, April 19, 20 and 21.

Up-State Telephone Association of New York, Jamestown Hotel, Jamestown, May 25, 26 and 27.

Coordination of Electrical Systems

The Trend of Developments in the Coordination of Power and Telephone Systems Presented Before Annual Illinois Convention—History, Results of Recent Investigation, and Problems of Future In This Perplexing Situation

By Frank F. Fowle,
Consulting Engineer, Chicago, Ill.

There was a famous son of Illinois who once remarked that in order to find out where we are going, we must first find out where we are. We might extend this sage observation by remarking that in order to know where we are we must first find out how we got there.

If we were to pursue the second part of this text in the effort to discover when and how the problem of electrical interference first appeared in the development of the electrical arts, it would take us back to the year 1844, when Morse and Vail discovered that two parallel overhead telegraph circuits were inductively related. They also discovered promptly that lightning was a very troublesome source of interference, and it is still an unconquered problem, 87 years later.

Although this is interesting historically, the interference problems which proved more troublesome did not arise until after 1880, when the telephone and the electric arc light were first coming into commercial use. By 1890 the advent of the electric street railway resulted in a new type of interference problem, and presently the opposing interests engaged in legal controversy which had far-reaching consequences.

The modern alternating-current system of power generation and distribution was contemporaneous with the electric street railway and by the end of the 19th century was rapidly extending electric service to areas which could not be reached economically with the very limited voltages of the direct-current system. During the 90's were built the pioneer systems for the long-distance transmission of power, which in respect of voltages, distances and power capacity would be today no more than distribution systems for serving rather limited areas. These systems, however, were the genesis of modern electric service which makes our present civilization possible.

Historically it is also of interest that the limitations of the ground-return telephone line were discovered before 1885 and the advantages of the long distance metallic circuit were commercially demonstrated between New York and Boston a year or two before that date.

The first long distance lines of the American Telephone & Telegraph Co., constructed in 1886, were metallic and were equipped with the first systematic

transposition system for preventing crosstalk between parallel circuits. By 1900 the system of transposition was greatly improved, with marked reduction in the crosstalk level and much better general coordination with foreign systems.

Many important advances in the telephone art were made during the 1890's, but two of outstanding importance were the dry-core paper-insulated cable and the common-battery multiple switchboard. Both of these advances embodied the general principles of balanced metallic circuits, which were very essential for proper coordination of the plant units of the telephone system with each other and the general coordination of the entire telephone plant with foreign systems in adjacent locations.

The urban exchange systems originally constructed with magneto equipment and ground-return lines were rebuilt with common-battery equipment and metallic lines, and the all-cable type of outside exchange plant came rapidly into use. In rural districts the magneto ground-return system, despite its disadvantages, still supplied the needs of communities where electric light and power were luxuries scarcely hoped for.

As we now pass the turn of the century we take leave of the era of pioneer development and exploitation and enter the period of amazing commercial expansion in both power and telephone service, which is unparalleled in any other country in the world.

At the opening of this period the interference difficulties were usually within the confines of cities and adjacent suburbs, where the two classes of distribution facilities were naturally in more or less proximity. But the parallels were not often of great length, distribution voltages were seldom over 2,300 volts, and the total power demands were still comparatively small. Consequently, the problems of coordination, while frequently troublesome, did not present difficulties of the order which presently arose with the rapid expansion of long distance power transmission.

Many of the early transmission systems were built in conjunction with the rapid development of interurban electric railways, in the decade from 1900 to 1910; others were constructed to bring hydroelectric power from remote generating sources to centers of distribution, and instances of serving nearby towns and villages from the larger distribution centers began to multiply. Parallels with rural telephone systems and toll lines, built perhaps a decade or more earlier, were both on the increase, in numbers and length.

The basic principles of coordinated transpositions in the two systems were developed shortly before 1905, and were used to advantage in specific instances, but their application did not become general practice until a somewhat later date.

The decade just mentioned was also marked by growing friction and controversy between the two groups of interests, with an increasing tendency to resort to the courts for the purpose of establishing legal rights. The outcome of these contests was varied, but on the whole was not constructive and failed to prevent the repetition of legal controversy when fresh occasion arose.

Notably because of the regional waterpower situation and the limited fuel resources, the progress of pioneer developments in power transmission was more striking on the Pacific Coast than anywhere else in the country. This situation

In His Address Before the Illinois Telephone Convention Mr. Fowle Gave a Most Interesting Outline of the History of Inductive Interference and the Development of the Coordination of Power and Telephone Systems.

brought about the first cooperative attack on the coordination problem, instituted in 1912 under the supervision of the California Railroad Commission. Its report, published in 1919, was the most important contribution to the subject up to that time.

With the passing of the national emergency created by the World War, the National Electric Light Association took up the problem for the power industry throughout the country and appointed an engineering committee on inductive interference. A few years later this committee was re-named the "Inductive Coordination Committee," and about a year ago its name was changed again, to "Foreign Systems Coordination Committee."

The situation which brought about the organization of this committee was the growing tendency of communication companies to appeal to the courts and commissions to protect their service from the rapid expansion of power systems, based on the expectation, or at least the hope, that a remedy could be found through the adjudication of legal rights.

By 1920 it was becoming more and more evident that the use of legal process was not a satisfactory solution, especially from the standpoint of the public interest in both kinds of service. Early in 1921 a movement was initiated by the National Electric Light Association and the Bell Telephone System to abandon legal process and substitute voluntary cooperation as the best means of arriving at a solution in the joint interest of all concerned.

This proposal took firm root and brought about important changes in the accepted philosophy of the rights and duties of neighboring utilities serving the public. A permanent organization, known as the Joint General Committee of the National Electric Light Association and the Bell Telephone System, was formed in 1921 and brought together a joint group of engineers for the purpose of undertaking fundamental and complete study of the entire problem.

This organization has been functioning for about nine years and has been very successful in establishing cooperative relations between the member companies of both groups and advancing the art of coordination of the two classes of physical systems. Its work is not yet finished; in fact, it appears probable that such work can never be regarded as finished, because with the growth of commercial development and constant advances in the arts, fresh problems will continue to present themselves and their proper solution will demand cooperative fundamental study.

The Joint General Committee issued its first report in 1922 on "Physical Relations Between Electrical Supply and Signal Systems," which contained the first joint statement on record of "Principles and Practices for the Inductive Coordination of Supply and Signal Systems." These principles have stood the test of nine years of experience. While they will probably be improved and extended at some future date, they have proved on the whole to contain the fundamentals necessary for successful cooperation and coordination.

Two further reports of this committee appeared in 1926, one entitled "Principles and Practices for the Joint Use of Wood Poles," and the other on "Allocation of Costs Between Supply and Communication Companies." These three reports are obtainable from both the N. E. L. A. and the Bell System, and should be in the hands of all responsible officials and engineers of the Independent telephone group.

The joint subcommittee on development and research published the first volume of its results in 1930, containing four technical reports of permanent value, including the results of the Minneapolis investigation of noise-frequency induction in telephone distribution systems situated on joint

poles with power distribution systems. At the winter convention of the American Institute of Electrical Engineers held in New York, January 26-30, 1931, there was presented a very interesting "Symposium on Coordination of Power and Telephone Plant," comprised of a group of engineering papers describing the status of the joint development and research work.

These papers are well worth study by those interested in the technical progress which has been accomplished to date. They do not constitute in any sense a final report, but indicate the present status of two very active and rapidly-changing arts in which highly satisfactory results have been attained by cooperative effort of the two industries. Further technical publications, on numerous topics, have appeared from time to time, in the serial reports of the foreign systems coordination committee, published by the N. E. L. A.

If now we hastily review the whole history of this coordination problem during the 50 years of its existence from 1880 to 1930, it seems quite obvious that the last decade stands out in major importance for the development and application of the principles of cooperation, and for joint attack on the whole problem through the process of fundamental research. If moreover we compare the status of coordination at the beginning and the end of this decade, the progress made seems very striking. Yet during this decade both industries have been actively expanding and making very important technical advancement.

While the population of the country increased only 16 per cent, the telephone stations increased 88 per cent, annual telephone messages increased 96 per cent and toll circuit mileage increased 250 per cent; electric customers increased 127 per cent, annual kilowatt-hour usage increased 107 per cent and power transmission line mileage increased over 100 per cent. The effect of this growth has been, almost obviously, to increase the number of situations of proximity and extend the applications of coordination.

In telephone practice there have been notable increases in the use of toll cable, telephone repeaters and carrier systems, and important extensions of telephone communication with foreign countries. In power practice there have been increasing uses of higher voltages for both transmission and distribution, increasing use of networks and system inter-connections to improve service and minimize the consequences of local faults, marked increase in the domestic applications of electricity, and considerable progress in extending electric service to farms.

The commercial standards of both power and telephone service have advanced materially during this ten-year period; the reduction in average delay on long distance telephone connections has been a development of the most outstanding importance.

GREETING!

That all members of the telephone fraternity enjoy a Merry Christmas season is the sincere wish of "Telephony's" staff. May the telephone wires perform with a minimum of trouble, and the service continue its faithful aid in carrying the messages of "Peace and Good Will" which have a special significance in these Yule-tide days!

Furthermore, "Telephony" extends the telephone industry its hearty wishes for a Happy New Year. Telephone men—and women—have worked hard in 1931, and have come through a difficult period with honor. Here's hoping that 1932 fulfills their hopes for the increasing prosperity to which they are richly entitled!

Noise-frequency induction of a magnitude affecting communication service has always been a matter of serious concern to telephone engineers. It is probably safe to say that the general level of such induction on the telephone wire plant of the country has been reduced very substantially during the decade just ended.

The means by which this has been accomplished include improved electrical balance of both classes of systems, increased application of coordinated transposition systems, improved control of power system wave shape, development of means for reducing inductive coupling by the use of shielding on both classes of lines, and the general adoption of advance planning and cooperation in selecting coordinated locations for new lines.

Much research work has been conducted in the effort to discover the true characteristics of earth conductivity and uncover the complete phenomena which determine the magnitude of inductive coupling between neighboring lines. The results of this work, although far from complete, have already been of great value.

The general technique in the handling of noise-frequency problems has been greatly advanced, and it is now feasible to predict, at least approximately, how much noise will be present in a specific case when the necessary fundamental facts are known in advance. Complete perfection of electrical balance in both systems is, of course, the theoretical ideal, but in commercial systems there must ordinarily be an economic balance between the ideal and the attainable, which can only be determined by engineering consideration in specific cases.

This applies often in the case of parallel distribution systems, where certain inherent unbalances in either system, or possibly both systems, are the means of securing important economies in the cost of service. With the expanding needs for both classes of service and the rapid advances in the two arts, these problems appear to be gradually assuming their permanent place in the system engineering of both types of utility.

The other general type of coordination problem is that concerned with low-frequency induction, which includes the power system fundamental and its lower harmonics, as distinguished from the higher harmonics in the audible range, or so-called noise frequencies. The inductive effects are chiefly of transient character, coincident with the occurrence of a power line fault to ground, which results in momentary abnormal current.

The effects depend upon the magnitude of the induced voltage, its duration, and the frequency of such occurrences. Specifically these effects may include false signals, interruptions of service, damage to plant, and, in severe cases, acoustic shock to telephone operators, and electric shock to plant employes working on the circuits affected.

There has been a steady trend in power system design and construction to increase the inherent strength, electrically and mechanically, against fault occurrences and to improve the protective equipment for limiting the duration and intensity of such faults. Considerable progress has also been made in the application of shielding as a mitigative device in exposures where increased separation or diminished length are impracticable because of great cost or physical obstacles.

Development work is also in progress on acoustic shock reducers and improved telephone system protectors, with encouraging results. The use of shielding on the telephone line has been found advantageous, and can be obtained at relatively low cost with circuits in lead-sheath cable by means of coordinated grounds on the sheath. Increased attention is being given to the coordination of grounding practices in neighboring power and telephone systems in order to prevent harmful interactions caused by resistance coupling through the grounding circuits.

Very marked progress has been made in the cooperative work on the joint use of poles for power and telephone distribution facilities. The problems involved in situations of this class include in their scope both service and safety. Heretofore the safe rupturing capacity of the protectors in the telephone system has been gen-

erally considered as imposing an upper limit on the power voltages which should be permitted in joint use. Recent investigations, however, tend to show that the protective devices in the power system also affect the safety problem in relatively great degree.

Where the power circuits are equipped with protective devices which de-energize them in the shortest feasible time when faults occur, there is very satisfactory evidence that the attendant hazards to the telephone plant are very greatly reduced. In fact, it appears very probable that numerous cases of serious damage or accident on joint lines would have been prevented, or limited to very minor consequences, if the power fault had been cleared in the very short interval which is possible with modern protective devices.

It is perhaps too early to say what effect such equipment will have on future joint use at the higher distribution voltages which are becoming an economic necessity, but the trend toward greater safety in joint use is rather obvious.

As regards the future there seems to be no serious reason to doubt the continued growth of both power and telephone service after the present depression has spent itself. Both types of service are indispensable, not only under present conditions, but especially with the return of normal growth in commerce and industry which many economists predict is not far distant.

The 6,300,000 farms in the country are as yet very inadequately supplied with electric service, and at the close of 1930 only about 10 per cent of this number were served. This class of customers increased about 16 per cent during the year 1930, and from 1923 to 1930 the total number increased at a rate which doubled every 3½ years. The expected growth in this class of service stands out as one of the future developments which will make the coordination of rural distribution systems of increasing importance.

Another trend which is frequently discussed today is the movement of industry away from large centers of population, in order to secure more favorable locations near small cities and towns. The general availability of cheap industrial sites, ample electric power, efficient transportation, universal communication facilities, and greatly improved living conditions, appear to offer much in favor of such decentralization. The consequences of a definite and substantial trend of this character on the coordination problems of the future are almost too obvious for comment.

In view of the outstanding accomplishments of the past decade in establishing voluntary cooperation between power and communication interests, and the important benefits resulting from the technical advances in the art of coordinating the two classes of systems, it would seem to be reasonably sure that the progress of the future will be along the same paths which have brought us to the situation existing today.

Boost Sales of Christmas and New Year Toll Calls.

We have had so much talk of economics, efficiency, and reaching that proverbial corner of prosperity, that a change to the thoughts of the more spiritual desires and happiness, will have the effect of—

"Sweeping our brain afresh, of cobwebs blue
For happier thoughts of rainbow's brighter hue"

Little as we may think of it, we have had at our command the facilities of bringing friends and relatives together in a happy reunion, if only for a brief period. We can do this by suggesting the use of night or evening station-to-station social calls.

I shall always recall with pleasure the opportunity I had of changing the disposition of a certain man. He was always grumbling about the service, so much so, that the operators really gave him preference, at times, just to humor him.

About this time last year in the course of the conversation with him, I asked if he planned to leave the city for the holidays. He said that he could not get away, although he and his wife would enjoy visiting their married daughter, who lived in a distant city. So I suggested that he make a visit via telephone; as he had ample time, to write and tell his daughter that he would telephone her at midnight on Christmas Eve.

Several days later, when he saw me, his face lit up with a smile, as he said: "Say, I do not care how much that long distance call cost. I will gladly pay it, for both my wife and I enjoyed talking to our daughter and listening to the children; and my wife enjoyed a good cry afterwards. So through your kind suggestion, we enjoyed the day far more than we would have otherwise."

Let us promote this thought on every occasion. It will build up a good will that cannot be estimated in dollars and cents; in short, we will be nothing short of Santa Claus' traffic transportation of good cheer.

Lennox, Ga. J. F. Brady

What Operators Want to Know

Holiday Season Busy Time in Traffic Department—Good Inward Service Very Essential to Avoid Traffic Delays—The Spirit of Christmas—25th Installment of Question and Answer Series

By Mrs. Mayme Workman,
Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

This is the 25th installment of our question and answer series, and incidentally it will soon be December 25. This is always a very busy time in the traffic department.

May I urge every chief operator to keep in close touch with her Inward service during the Holiday season. This is very essential so that traffic may move along without delay.

Let us all enter this Christmas Season with the spirit which I have tried to express in the following verses:

The Spirit of Christmas.

At this joyous time of giving,
When we find life well worth living,
And our hearts are filled with happiness divine:
We have thought of "Dad" and "Mother,"
And our cunning little brother,
As we purchased gifts to please them "oh, so fine!"

In our joy and our excitement,
Let us not forget those others
Who are seeking too, to spread their "Christmas Cheer":
Let us put their calls up gladly,
Though the signals come in madly,
It means, oh, so much to loved ones far and near.

When the busy season's ended
And our calls come in just normal,
What a wondrous satisfaction it will be,
Just to know we made folks happy,
Never answered signals "snappy,"
Though we were just as busy as could be.

So come now, all together
Put the "smile" into your greeting,
Let your nimble fingers fly with all their zeal:
"Merry Christmas!" "Happy New Year!"
Help to send the happy tidings,
And the "Spirit of the Season," will be real.

Questions from Illinois Operators.

1. On a "WH" report, what should be done if the original call can not be found immediately?
2. When you are "WH" with the called party and the calling party is "DA," "u today," etc., is the subsequent attempt time for "AG" the same as on a new out call? How long should we try to reach the calling party?
3. Which is the correct way to call a collect number?
4. Why is there a report charge on an "NRG" report?
5. What should the Inward answer interval be?

For answers to these questions from real Illinois operators turn to page 22.

Confessions of Telephone Porch Climber

Two Plant Men Compare Notes and Exchange Ideas for Selling Service—Value of Prospect List—Commercial Department's Training Course Teaches Marketing and Sales Management; Develops Alertness, Perseverance and Common Sense

By Elmer Everetts

"You're in a tough spot, Joe," said a Bell plant man to a fellow worker the other day. "You've sold every type of telephone service we have to offer to every kind of customer there is to sell, worked in every department of the business, taken every training course made available, and now there's nothing left for you to do."

"Sure there is, Bill," answered Joe, jokingly, "I'll write my autobiography next, and call it the 'Confessions of a Porch Climber.' What do you say?"

"OK by me," replied Bill, "but when I write mine it will be something about the second-story man. I've climbed so many staircases the past week that I feel like a step child. But, gee, Joe, I'd surely like to hear you tell about your adventures in pursuing the prospect. It encourages me when my dogs are tired."

"There's an idea, adventures of a prospector in an All-Employes Sales push! But seriously, Bill," continued Joe, "pursuing the prospect is a fascinating game, and a productive one too. As you know, I've been on the trail of the sale ever since the big chief sounded the clarion call that first rallied all of us to our good old banner.

Making Use of Prospect Slips.

"There were so many prospect slips turned in by 'the one big family' that some of us had to give up our regular jobs for the time being and sell service. We all did a good job too, but Old Man Disconnect and deferred business operations caught up with us and kept on going until the Gloom Twins had registered a loss of more than 2,500 stations."

"That's when I closed up my desk for a couple of months to start training to become a salesman," said Bill.

"Yes," assented Joe, "and there's about a hundred more like you, Bill. When the chief sounded clarion call No. 2, the heavens opened up and belched forth so many little blue prospect slips that the commercial department had to wade through them ankle deep the next morning when they came to work."

"Don't I know it," agreed Bill, "everybody is doing it—engineer, janitor, clerk, accountant, stenographer, plant man, operator, commercial man, and who else have you. They're all at it, and we porch climbers are out in hot pursuit of their prospects. No wonder we were able in just one month to cut that station loss by more than 5,000."

"We did a real job, and no foolin'," said Joe, "but if we keep up the old fight we will soon be in the black again and back on our old jobs.

"But you know, Bill, when I think of it, I believe I'll really be sorry when it's all over. Why I've thought sales, talked sales, made sales, and dreamed sales so much that I'll never forget sales when I go back to the regular job; I'll still be on the alert to sell more service. As long as there's a prospect's door bell to ring, there will be a punch in it for me.

It's been hard work, though. Remember that corset woman that I told you about—the one who politely told me to get out of her office. Well, the other day we were in the elevator together, and as she left it her hand hit the door and she dropped silver all over the corridor.

She and I had a fine time finding it all. A customer was waiting in her office for the change she had gone down to get. A quarter was still missing, so I slipped a quarter from my pocket and pretended to find it. After she went into her office, I continued to look for the quarter, and she caught me in the act as she walked to the elevator with the customer.

Just as I fished the quarter from under the radiator in the corner, she asked me to step into her office. The day before I was asked to step out of it. This time I was able to show her that our traffic department had made a study of the service coming in over her individual message business line, over a three-day period, and that between the various hours shown on the respective days there had been 28 times customers had tried to call her by telephone and couldn't get in because her line was busy.

Obviously, an auxiliary line and extension, with associated keys to give service on either or both lines with double the calling rate was the answer; and that's just what she subscribed to. That's a real service our company is offering the customer in those busy-line reports made under the personal supervision of the chief operators in the respective offices. I'm strong for them."

Various Services Available.

"So am I," Bill agreed. "That's what I'm learning about now in the commercial department's wiring plan school. I think it's great that a customer who has a master station and an extension can have it arranged so he can intercommunicate between the two stations while a calling party is held on the central office line."

"Sure," said Joe. "That's a No. 203 wiring plan. The same thing can be done on two lines or even up to five lines. Of course, the next step is probably an I. C. S.—you know, an intercommunicating system, or a cordless P. B. X. After that comes a cord board. You'll find that we have telephone service to meet the customer's every need, and when he finds out about it he'll want it. It's up to us to tell 'em and sell 'em.

"The telephone can help the baker turn his dough into dollars, assist the university to speak up as an institution; for the printer it's just the type, and what could be more appropriate for a manicurist than a handset.

It's a real thrill, Bill. The farther you go the better you'll like it."

"Unless I'm going upstairs," put in Bill.

"Oh, you'll get over that, too," Joe laughingly answered. The climb-it is rather severe, but you'll soon become acclimated. After you've had some of the experiences I've had, you'll forget all about it.

Turning Suspects Into Prospects.

"When I first started I used to wonder which of the blue slips turned in by employes were prospects and which were suspects. After I spent hours looking for a long-lost street, a no-such address, a vacant lot, and a vacant store or two, I began to think that all those blue slips were suspects, not prospects. But I soon learned not to give up even on that kind of prospect. I'm glad now I did learn that, too. I'll tell you about it and I'm sure you'll agree with me.

Of course, I know you can't sell a telephone to a vacant lot, or a vacant store—but you can try to sell any of the houses next to the vacant lot. You can get the name of the realtor or leasing broker from the sign in the window of the vacant store, and often get in contact with a prospective renter of the store through that channel.

The other day one of the fellows had a prospect slip for a vacant apartment. Did he mutter something under his breath, stamp out of the apartment house, and that evening when he made out the individual 'Thank You Slip,' which each employe receives who has forwarded a prospect slip, say 'Vacant—No Access?' No! That's what he used to do, but not now. Here's why:

He went to the end of the hall to another apartment. The door stood partly opened. He smelled gas. He punched the door bell. No answer. This apartment looked vacant also, but why was the door open? Another ring. No answer. He was

about to go when he heard a slight groan. This time he entered.

His pursuing the prospect beyond the address given, resulted in his arriving in time to carry the unconscious landlady from a gas-filled room into the fresh air and revive her. That natural gas is just naturally tricky and deadly. The fellow has sold lots of service in that apartment house since that day.

Then there was the case of one of our dining-room matrons who journeyed clear across town after a day's work to call on a prospect. When she arrived she discovered a bedridden mother and three hungry, crying, frightened children. A few hours of efficient work, an inter-city call sent speeding on its way, a red order issued for an emergency telephone installation, brought convenience and comfort, aid and cheer to that little family, and the timely return of a grateful husband and father.

Bill, I could go on indefinitely telling you of how this all-employe sales campaign is helping more than just the telephone company and its employes. The public is sharing in many of the benefits accruing from our joint activity."

"Some of the fellows are taking the commercial department's training course in inter-city service," said Bill. "What's it all about?"

"Well," replied Joe, "that is one of the most complete and comprehensive courses ever operated by any employer. It is really a course in American business practice with particular emphasis placed on industries' communication requirements.

"The idea is this, Bill. The prospective buyer of any commodity or service either recognizes or must be brought to recognize his want and need for that product or service and the uses to which it can be put. In the case of some commodities, these wants and uses are easily recognized by both the salesman and the prospect and comparatively little analysis of the prospect's specific requirements is necessary.

Analyze the Prospect.

"There are, however, a great many products or services for which a complete analysis must be made before the prospect will recognize their uses and advantages to him. The sale of telephone service, and inter-city service in particular, to our larger customers may be classed among these.

As you can well imagine, Bill, the sale of inter-city service requires a complete knowledge of how our customers' businesses are conducted in order that a salesman may make an analysis of their communication requirements to determine how our services may be applied to these requirements.

That's what you'll get in that course, Bill. You will learn a lot about certain aspects of business operations, particularly about marketing and sales management. Of course, Bill, marketing covers a lot more than the name implies. It includes everything that takes place from raw material to finished product placed in the hands of the ultimate consumer. Some of these business operations are extracting, assembling, producing or manufacturing, distributing, marketing methods, types of marketable products, types of middlemen, marketing channels, and communication media.

You'd really be surprised, Bill, to know just how often our telephone, leased wire or telephone service fits into the picture. There are very few, if any, operations in business where someone or more of our services will not be of tremendous value.

Obviously, Bill, a thorough understanding of these subjects is essential to a sympathetic understanding of the operations of business from the standpoint of customers and the value of our services in terms of our customers' own business."

Three Qualifications of Salesmanship.

"If you have had all that training, Joe," said Bill, "it isn't any wonder you're a good salesman."

"Well," confessed Joe, "there really is a high degree of salesmanship involved and this course does help you to develop the three essential qualifications of salesmanship—alertness, perseverance, and common sense. It also helps you to measure up to the two fundamentals of sales work which are always to be observed: Know your own product or service, and know your customer's requirements and standing in general.

"Selling is done this way, Bill: First, you prepare yourself thoroughly. This is often called pre-approach. When you are sure you are ready, then go ahead. This is called approach, and then comes demonstration or sales talk. If your talk is of the right calibre, it will make for a successful close.

And remember, Bill, a good approach means a sale half-made. Plan your approach carefully and you will have no difficulty at the close. And watch carefully for the unusual. Don't let a sudden occurrence of the unusual throw you out of equilibrium. You might lose your man while you flounder about trying to get back on the track.

The other day I was talking to a man who was hard of hearing. I was explaining the value of expanding his usage and he interrupted to say that he didn't deal in sausage.

It's a great game, Bill, and most of us are in it for life, so we may as well get all the pleasure we can out of it."

"Where do you find all the people to sell to?" asked Bill. "Are they all turned in on prospect slips by fellow workers?"

"Well, perhaps the majority of them are," Joe answered. "You see, we have thousands of employes right here in this state and the total sales per employe for eight months in 1931 is nearly three sales apiece. But, of course, there are thousands of company-initiated sales too. I told you about the three-day busy-line studies and also this inter-city activity. These prospects are discovered from analysis of toll tickets, or individual records of customers' toll usage.

"There are opportunities to sell on all sides. The other day a driver of one of our cars was hit by the driver of another car. The driver of the other car acknowledged that he was in the wrong. They exchanged information and the driver of our car said that he would call the other man up about it later. He didn't have a telephone. Instantly, an employe's sales manual and order book flashed into view and another name appeared on the dotted line. That's a stimulated sale, Bill. That's seizing an opportunity. Don't leave it to the other fellow.

Why, do you know, Bill, our company sells on the basis of genuine helpfulness. We must render individual assistance and work out a specific system before we attempt to sell service itself.

And remember, Bill, we have service aids for the customers that will enable them to increase the frequency of contacts with present customers and permit of making a lot of new contacts. It is called a key-town and skip-stop plan.

A salesman goes into a sizable key-town located in a market area, and from there calls certain surrounding towns by telephone. Next time he skips that town and visits in person one he has telephoned to last time. From here he telephones the one he last visited in person, and so on.

Many salesmen now carry telephone credit cards. This saves them from carrying a lot of cash with them to pay for calls. There are many other aids we have for the customer, Bill, and it will pay you to learn about them if you are going to help us sell.

Put Facts to Work.

"These are the facts, Bill, and in the words of Walter S. Gifford, president of the A. T. & T. Co., we must 'put facts to work.' And remember this, too, you musn't leave it to the other fellow. Sales work is everybody's work, now as never before. When you leave it to the other fellow, you and he and all the rest lose just that much business, because the other fellow is already doing his level best. He can't do his own capacity job and yours besides.

Sales are your job, and my job and the other fellow's job, Bill. And we can sell new installations, new extensions, directory listings, inter-city calls, and all those other services I've just told you about. So get busy, Bill, turn in your share of sales and prospects to your supervisor, and encourage the other fellow to turn in his."

"I sure will," said Bill, ever so enthusiastically. "We've got to make up that station loss for the big chief."

Here and There in Telephone Work

"Protect the Public" from Ole Man Accident.

By Jake The Lineman.

Well, well, every one out for practice. From the way you're bootin' the ole ball aroun', "Ole Man Accident" had just as well start diggin' his own grave.

Last week I was a'readin' agin. Seems as though that's 'bout all I want ter do when the day's work is done. I read where George Eliot once asked: "What do we live for, if not to make the world less difficult for each other?"

Now, in our work we're sure a helpin' ter make this ole world a better place to live in, cuz we keep the lines an' equipment in fust rate shape so that anybody can call from any place to anywhere. But if we watch a few things while we're doin' our work we can sure help to keep "Ole Man Accident" from touchin' the public. Fer instance:

Broken insulators should all be cleaned up before you leave the job. A jagged piece of glass layin' aroun' might cause some barefooted boy hours of sufferin' with a badly-cut foot.

Eager children, anxious to go to the top in life, often choose a pole upon which to start the climb. Point out the dangers to them. Tell them to wait 'til they grow up, an' then if they still want to climb poles—well; there'll always be telephone companies!

Children should not be permitted to handle tools or materials. Curious children constantly cause calamities.

Always cover pole holes, fer if somebody or somebody's hoss or cow was ter step in an open hole, it might mean a lot of trouble fer your company.

Remember to warn the public of danger by signs, lanterns, or flags, and, Buddy, even after you put out warnings, keep yer eye peeled fer some one who doesn't believe in signs.

Ends of wires should not be left protruding. They might strike some one in the eye, and that might mean a blinker gone. We humans have jist two eyes apiece, so let's every one of us do our part to help people keep 'em.

Fastening of temporary guys to fence posts is dangerous. Suppose one gives way! Some one might get hurt.

Underground entrances are a real hazard unless properly protected by guards, flags, and lanterns. There's somethin' else to remember when you're workin' in a manhole—don't ever throw tools or equipment from the manhole. They might hit some one or roll back on you.

Let's you an' I preach Safety and practice Safety! It's a lot better to preach "Safety First" than to have a minister preach the last words over you.

That'll be enough new plays for today. Practice them all durin' the week and keep up your safety work.

I got ter be a'ramblin'. Ma's havin' some good ole country sausage with heaps of hot biscuits and lots of brown gravy, and—Man! I'm sure starved!

See you next week, and remember, Buddy, think of the wife and kids and do it the safe way. Jake wishes you an' your family the merriest and happiest Christmas you've ever had. So long!

P. B. X. Current; Charging Battery from Central Office (ctd.).

By John A. Bracken.

In estimating the required capacity of a storage battery to be located at a private branch exchange and charged from the central office battery over cable conductors, the usual practice is to allow approximately 40 to 50 milliamperes of current for each cord circuit, making ample allowance, of course, for possible extra demands of battery power.

In order to find the approximate rate per hour of current required to charge a P. B. X. storage battery from the central office, multiply the total number of cord pairs by 0.05. This will give a fair estimate of the total current drawn per hour from the P. B. X. battery, provided all cord pairs are in use.

Example: Suppose the P. B. X. switchboard is equipped with 10 cord pairs, then 10 times 0.05 equals 0.50. If the E. M. F. of the central office battery is 24 volts and a current of 0.50 ampere is required for charging the P. B. X. battery, the question arises: How much resistance will be needed to connect in the circuit between the central office battery and the P. B. X. battery?

This may be determined by applying Ohm's law formula: $E/I = R$, or 24 divided by 0.50 equals 48 ohms. This 48 ohms would be the proper amount of electrical resistance to insert in the charging circuit were it not for the fact that each storage cell in the P. B. X. battery possesses an E. M. F. of approximately 2 volts, and as this voltage opposes the 24 volts of the central office battery, the actual effective E. M. F. of the charging current will be the difference between the two electromotive forces.

Suppose that the P. B. X. battery contains 8 cells, the effective E. M. F. of the central battery would be $E-e$, or $24-16=8$ volts, and $8/0.50=16$ ohms; 16 ohms, then, would represent the correct electrical resistance for the charging current of 0.50 ampere to the P. B. X. storage battery under an initial E. M. F. of 24 volts at the central office battery.

The cable conductors used to transmit the charging current may be arranged to furnish the required resistance as well as having sufficient carrying capacity, depending upon the size of wire and the distance to the P. B. X. from the central office.

When charging P. B. X. storage batteries from the central office by the grounded method—that is, one pole of the P. B. X. battery connected to the earth or ground and the other to the cable conductors—it is often complicated by electric currents known as earth currents, caused by insufficient or faulty return circuits of street railway systems.

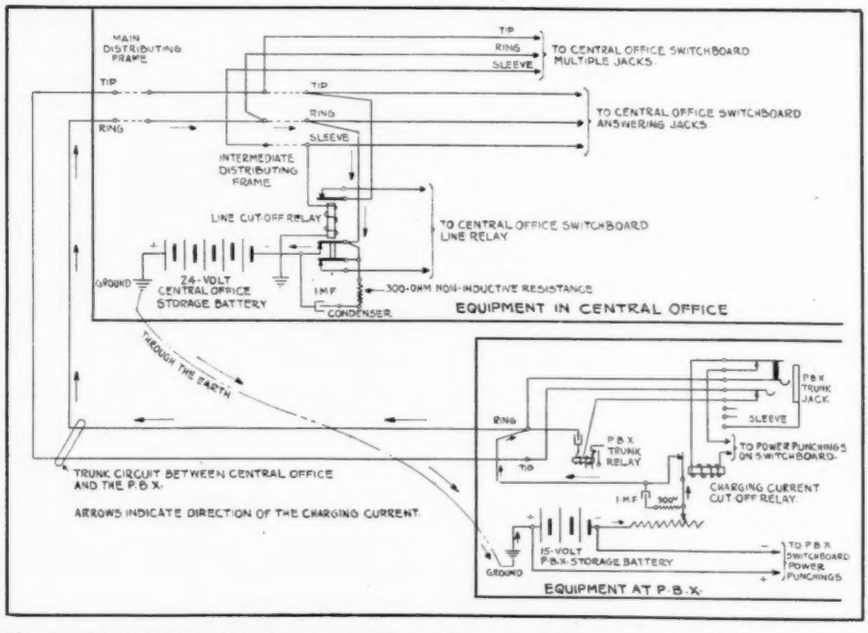

Fig. 1. A Method of Charging the P. B. X. Storage Battery Over One Wire of a P. B. X. Switchboard Trunk Circuit.

When charging P. B. X. storage batteries from the central office by the grounded method—that is, one pole of the P. B. X. battery connected to the earth or ground and the other to the cable conductors—it is often complicated by electric currents known as earth currents, caused by insufficient or faulty return circuits of street railway systems.

Remembering that both the central office and the P. B. X. batteries are generally negative in polarity—their positive poles being connected to the earth (grounded)—it is evident that if a street railway system has disturbed the potential (electric level) of the earth, making it, say, 8 volts more negative at the P. B. X. than at the central office, this neutralizes the difference between the two batteries, bringing both ends of the charging conductors to the same potential, in which case there will be no current through it and the P. B. X. battery will receive no charge.

If the difference of electrical potential between the two grounds, one at the central office battery and one at the P. B. X. battery, is greater, the P. B. X. end of the charging conductors becomes more negative than the central office and the P. B. X. battery will discharge back through the central office battery.

If, on the other hand, the P. B. X. ground is positive to the central office ground, the effective difference of potential between the two ends of the charging conductors will be greater than 8 volts, and the P. B. X. battery will receive a greater charge than is intended.

Charging troubles due to earth currents can be remedied by using a full metallic system of conducting the charging current from the central office to the P. B. X. battery and return. Fig. 1 shows a method of charging the P. B. X. storage battery over one of the P. B. X. switchboard trunk circuits.

The one-microfarad condenser and 300-ohm non-inductive resistance are connected across the contacts of the line cut off relay at the central office and the charging current cut-off relay at the P. B. X. for the purpose of absorbing the spark caused by opening the charging circuit at the relays, thus eliminating burned relay contacts.

Service of Outside Equipment Is Tested in Field Laboratory.

A field laboratory for outside plant studies is maintained by the Bell Telephone Laboratories on a 100-acre plot of ground near Chester, N. J. Studies and experiments of all kinds are being made at this modern laboratory in an attempt to produce better telephone equipment and provide better service to subscribers and greater safety for workmen.

Open wire, cables, poles and conduit are given numerous tests at this modern plant. Costly instruments to make these various tests are located in the buildings on the field.

The laboratory is scientifically laid out. Telephone pole tests are made on a certain portion of the field. Open wire lines and cable lines each have a field position, and conduit tests are made at a still different location in the laboratory.

Open-wire spacings are studied on a six-span line, which runs over the highest part of the property where it is exposed to the greatest wind velocity. Twenty pairs of wires of the standard sizes, and with various spacings between the wires of a pair are run on the five crossarms.

The wires terminate in the test house, where instruments are installed for recording each time any wire swings into contact with any other. Instruments also record the direction and velocity of the wind. An attendant also takes measurements of the sag, the insulation resistance, radial thickness of ice if present on the wires, and the nature of the weather.

Other studies of open-wire lines include those of sleet accumulations on several sizes of wires, of the comparative merits of various transposition arrangements as they affect contacting and of the actual motion of the wires under various wind velocities. This motion of wires on pole lines is studied by modified motion picture cameras which give a continuous record of the displacement.

Methods of supporting aerial cable are studied on a short pole line. Two messenger strands are supported about seven feet from the ground and from each is suspended a standard cable with different types of cable rings. A motor-driven mechanism swings the cables in an arc approximating that produced by a 50-mile wind blowing at right angles to the line. This violent swinging accelerates the wear so that data on deterioration may be obtained in a reasonably short time.

Comparisons of the qualities of lead-calcium and lead-antimony cable sheaths are also being tried.

A variety of underground conduit studies is also being carried on, particular attention having been given recently to a mortar-bandage method of making conduit joints. This is made up of a plastic cement mortar with a covering of cheese cloth which is tied around the conduit joint. This joint has the merit of effectively excluding ground water and silt from the ducts.

Concrete-lined trenches have been provided to test the water-tightness of various experimental conduit joints.

These, and other tests make this field laboratory at Chester an important experimental station for the Bell System.

The "Making of Holding Tests of Guy Anchors" in the November 21 issue of TELEPHONY was a description of tests made by the Bell Telephone Laboratories near Asbury Park, N. J. This article which originally appeared in the Bell Laboratories Record under the title "Testing Earth Anchors" should have been credited to C. H. Klein of the outside plant department of the laboratories.

THE COME-BACK

By "BUCK."

Pete Jones, some years ago, was fired—he didn't fill the bill. He'd always acted kinda tired, as some young fellers will. So, fer awhile young Pete was sore at all telephone companies because from one he'd got the door—the "grand bounce," if you please.

An' then he thought it out one day, decidin' that he would git back into the game an' play, determined to make good!

He lit out fer another town, did this young Peter Jones, an' got a job. He hustled 'round,' installin' telephones an' stringin' wire. He dug right in an' earned the wire-chief's praise. Not lazy now, he worked like sin, an' soon he got a raise.

Then, soon a vacancy occurred—a foreman was retired. Who got the job? This Pete Jones bird who once had got ge-fired!

The comp'ny bought a new exchange an' someone had to run it. By Jiminy, it wasn't strange they picked Pete Jones, dug-gunnit!

An' now he's sup'rintendent, sir, this Pete who got the sack. He'll soon be gen'ral manager.

By gosh! They do come back!

"Monarch of Bermuda" Now Has Telephone Link with Shore.

Passengers on the "Monarch of Bermuda," new liner of the Furness Bermuda Co., are able to keep in close touch with home and office during each voyage. Ship-to-shore telephone service with Bell System telephones was opened to the ship when it left New York on November 28 on its first voyage to Bermuda.

The radio channel is operated on a short wave, on some of the same wave lengths now used for the A. T. & T. Co.'s telephone service with transatlantic liners. The transmitter on the "Monarch of Bermuda" was installed and is operated by the Marconi International Marine Communication Co., Ltd. The transmitter has crystal control circuits which keep it close to its assigned wave length. A 120-foot single-wire antenna is used for transmitting and receiving.

Switchboard Markings; Purpose and Use

Color Scheme Used in Marking Switchboard for Information of Operators to Indicate Status of Lines and Stations—Paper Read at Operators' Conference Held During Annual Meeting of Up-State Telephone Association of New York

Miss L. T. Bailey,
Division Traffic Agent, New York Telephone Co., Syracuse, N. Y.

The modern business man has learned that a satisfied customer is usually his best advertisement. The ever-increasing demand for faster and better telephone service has been met by the management of the various telephone companies in many ways.

Some telephone companies will spend money, time and effort in improving plant conditions. They will rebuild lines, install a new switchboard, buy a new building, redecorate and provide comfortable restrooms; in fact, do almost anything to keep conditions satisfactory as far as the plant is concerned. All of these things are important and, of course, necessary.

While plant conditions are usually quite obvious, operating practices that annoy customers are often lost sight of. One reason for this is that customers do not always let us know when they have experienced these little annoyances.

The practice of unloading unnecessary detail on the operating force, such as remembering the status of every line and station in the office, is a detriment to good service. If switchboards have distinctive markings, it will not be necessary for operators to remember which lines are working, which ones are changed or disconnected. I think we have all learned that even our memories are a bit tricky at times.

Recently this was brought to our minds rather forcibly by the following incident. An experienced operator, on a switchboard which had not been marked, gave several reports of "don't answer" on a station. Upon a request for verification of the report, it was found that the telephone had been disconnected for over a month. If her switchboard had been marked, the call would have been satisfactorily disposed of on the first attempt.

In order that all calls may be properly completed, the switchboard should be marked to indicate the status of the lines and stations. This can be done by means of painting and signal plugs. By using imaginary lines, the circumference of the jack can be divided into quadrants. Then the party line designations can be assigned to the quadrants. The upper left quadrant can be used to designate the status of "J" stations, the lower left "M," the upper right "R," and the lower right "W."

On rural lines the upper left quadrant can be used to designate changes and disconnects on rings ending in 1 and 2, the lower left 3, the upper right 4, and the lower right 5 and 6.

In using the quadrant markings, the marking should be confined to a little less than one-quarter of the jack's circumference on the rim of the jack, close to the jack opening, but not so close as to extend over into the opening, as this may interfere with the busy test. Each quadrant marking should be separate, with a break between adjacent markings. It is advisable that all offices use standard colors and the standard method of marking switchboards in order to facilitate the completion of calls.

In considering switchboard markings, it should be borne in mind that all markings must be distinctive so that they can be recognized at a glance. The distribution of the space around the jack and the color scheme used must be instantly legible. We have found that the lighter shades of the bright colors stand out more vividly and involve less strain on the eyes of operators.

Our company uses the following system of multiple markings and has found it very effective:

Yellow quadrants are used to indicate changes and disconnects and red quadrants to indicate vacant stations. For a change on an indivdual line a white plug bearing the new number in black is placed in the jack. In this case the change can be given immediately, while on the party lines it will be necessary for the operator to refer to a bulletin for the change.

A disconnected station on an individual line is indicated by a yellow plug. This also necessitates reference to the bulletin. Vacant lines and party line stations can be designated by black plugs and red quadrants and the operator can give the vacant station report at once. This method of marking eliminates all unnecessary reference to the bulletin.

Private branch exchange lines are underlined with red or white. On groups of 10 or more lines the group is subdivided into groups of five for preferential testing. These preferential groups are indicated by painting a large red spot under each jack when the group is underlined with white and using the white spot when the group is underlined with red.

The two, four and eight-party semi-selective lines are underlined with green when all stations are working. The rural multiparty lines are underlined with blue if these lines are in the regular customer's multiple. Coin-box lines are indicated by painting a large white spot under the jack. When a coin-box station is on a party line the lines are marked with a large white spot, in addition to the required underline.

At offices where the report is given by the "A" operator various bulletins are used. One showing all changes and disconnects is mounted above the multiple between each two positions; another which is the "Improved Intercept Bulletin" is mounted above the multiple placed one per panel and shows the listings necessary to care for the intercepted calls in the panel

Answers to Traffic Questions Presented on Page 17.

1. At the end of one minute from the time you received the "WH" report, or sooner if you have completed your search for the ticket, if you have not found it, refer the case to your supervisor. Try to find out from the called party, if possible, who might be calling him. If he furnishes a telephone number or an address name, or says that he does not know from what telephone the calling party may be calling, dismiss him by saying: "I am sorry, there will be a slight delay on your call. I will call you." Reach the TTC operator and ask her to hold the circuit and the called number. Proceed according to the information received from the called party.
2. If, when you are ready on a call, the calling station has not answered at the end of one minute, release the calling line and secure it again, using a different trunk cord, if possible, and ring again. After another full minute of ringing, if the calling station has not answered, release the calling line. Your subsequent attempt time will be the same as on a "DA" report at the called station. Give the proper report to the called station or party.

   Subsequent attempts to reach the calling party should be made in accordance with instructions for reaching the called station or party.
3. Precede your order with the word, "Collect," as, for example, "Collect 8101."
4. "NRG" is classed as a chargeable report because this report gives the calling party some definite information concerning the called party.
5. To give satisfactory Inward service, signals should be answered within ten seconds.

in which they are placed. At offices where the report is given by an intercepting operator all changes and disconnects are marked with a red quadrant and on all individual lines that are not working the black plug is used.

For the larger offices, multiple check forms are used for checking the accuracy of the switchboard multiple at manual offices. An error in the marking of the switchboard is the cause of great annoyance to a customer. A competent person is assigned to check the markings periodically. A memorandum of all chipped and worn markings is referred to the chief operator or the central office clerk.

On the back of the check forms are spaces for the dates when the multiple is checked or repainted and the numbers of the sections where the work has been done. When a section has been checked or repainted the person doing the work enters in the spaces at the left of the section number her initials and the date the work was completed.

In offices where there are condensed numercial records, check forms and condensed numercial records are checked against each other from time to time to insure their accuracy.

In addition to multiple markings, common battery boards with line lamps should have lamp caps which bear special symbols or colors to indicate the class of service of each customer's line. The common battery boards with bull's eye signals require no special markings on the shutters as the multiple markings indicate this.

At magneto boards the face of the drop should be painted to indicate the class of service of each station, particularly the coin-box stations. Many irregularities occur due to the failure of the operator to announce to her toll center the class of service of the calling station.

An individual coin-box station at a magneto board should be marked with a diagonal white stripe from the upper left to the lower right-hand corner of the drop and a coin-box party line should, in addition to this white stripe, have a red stripe from the upper right to the lower left corner. In addition, a large white spot should be placed under the jack, in order to facilitate the handling of collect calls for coin-box stations.

An individual flat rate line requires no marking on either the drop or jack. A party flat rate line is indicated to the operator by a diagonal red stripe from the upper right-hand corner to the lower left-hand corner of the drop.

All switchboards, no matter how small, should be marked. At the smaller office the management or the operators may feel that there are so few changes that it should be easy to remember them. However, many a wrong report has been given on a station because the operator was supposed to remember and failed to do so.

Some managers object to having the switchboard marked, particularly if it happens to be a new one, but they do not realize the help that it is to an operator. If your manager feels that way about marking the switchboard, why not explain to him the advantages derived from it?

A traffic instruction explaining switchboard markings in detail has been compiled and can be obtained from the connecting company traffic department.

CHRISTMAS

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

"When Christmas comes"—the thought of it is like a beautiful strain of soft music playing on our heart strings. There is a difference as wide and everlasting as eternity between the significance of Christmas Day, and all other days of the year, whether they are legal holidays, birthday or wedding anniversaries.

What makes this difference? It is what we feel, think and remember about every Christmas Day we have ever had as far back as we have any recollection, all rolled into one—this one. It is a day for remembering—putting happy memories into other lives through our gifts. Perhaps this is the reason we call Christmas gifts, remembrances. On this day creed and greed are forgotten.

We are prone to look backward on Christmas Day. Every gift, song, toy, food aroma, recalls like memories of other Christmases. Strange how other days of our early lives are blurred, but our Christmases stand bravely out in the foreground of our memories.

We do not think the thoughts of grown-ups when we live over the joy of some of those distant Christmas Days. We become children again in memory as we scamper from room to room showing our gifts to parents, aunts, uncles, cousins, and neighbors.

If we could read grandmother's thoughts, as she watches little Mary playing with her doll, they would be of another child, the little grandmother herself, holding *her* Christmas doll.

Yes, many, many things that happened on Christmas Days of our childhood come back to us, recalled by a sound or a song on the present Christmas Day we are celebrating. Christmas carols call to mind one night long ago when we sang them out under the frosty stars. The sound of wheels crunching hard snow recall the Christmas Day the aunts, uncles, and cousins drove up in their big bob sled. What a day! What a glorious time we had! And no one was impatient, although we were very boisterous. So much seemed to be overlooked that Christmas Day that ordinarily called for correction. No doubt we were corrected on a later day, but that we do not remember.

We distinctly remember the first Christmas we celebrated when we thought there was no Santa Claus. We felt that Christmas would never be quite the same again, but we soon found we had outgrown the idea of Santa, anyway. In fact, we had made ourselves believe in Santa Claus, even though his voice and laugh sounded so like our father's. Besides, there were so many Santas—long, lean ones in store windows; short, fat ones in churches—we were glad it was all over. Now we could stay up, help decorate the tree, fill the stockings, munch candy and nuts, just as soon as the children went to bed.

What girl does not live over the memory of a certain wonderful Christmas when her boy friend came with his gift? That memory can never be effaced, no matter how many other times a similar thing happens. No matter who or where the boy is now, the memory stays on and adds its part to our happy Christmases.

I wish you all a Happy, Happy Christmas Day, dear friends, to add to your other Happy Christmas memories.

STROWGER AUTOMATIC
DIAL SYSTEMS

GENERAL EXPORT DISTRIBUTOR
Automatic Electric Sales Company, Ltd., Chicago, U. S. A.
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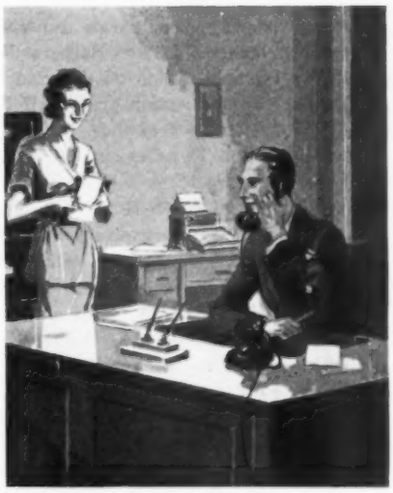
The GOOD-WILL Assured by Strowger Automatic Service is the Best Investment You Can Make!

LOOK at your problem of "whether to dial or not to dial" from the standpoint of its being an investment in good-will and there is no question about what you should do. "Perfectly satisfied subscribers for the next thirty years" is the assurance of Strowger Automatic equipment, for during its long life it renders faultless telephone service.

What would this be worth to you?—People so satisfied that they praise your service—cities priding themselves on it as evidence of their progress—personal satisfaction in giving your community, your associates in business, the finest possible telephone service.

As an investment in good-will Strowger Automatic equipment has no equal. From this standpoint alone it has a double return. First, the saving of all or practically all of those expenses incident to the dissatisfied customer. Second, additional income from increased use of your service. Satisfied subscribers use their telephones more—and find more uses for them!



The first step in figuring returns from an investment in Strowger Automatic equipment is to call upon Strowger engineers to find out exactly what this equipment will do for you and how much it will cost you. Write TODAY—complete estimates gladly furnished without cost or obligation.

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Manufacturers of
Strowger Automatic Dial Telephone and Signaling Systems
Factory and General Offices: 1033 West Van Buren St., Chicago, U. S. A.

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Hawaii's New Inter-Island Service

Mutual Telephone Co., Ltd., Honolulu, Hawaii, Develops a Radio-Telephone System Within Own Organization for Communication Between the Islands; New Facilities Which Have Many Special Features Are Described in Detail

Radio telephone service which was opened between four of Hawaii's eight inhabited islands on November 2, as mentioned in TELEPHONY of November 21, will soon make possible communication between any one of these islands and the rest of the world. It is now possible, through the practical application of beam radio-telephony, to talk between Oahu, Maui, Hawaii and Kauai. Eventually, Molakai will be added.

This will also mean that when transpacific service between America and Hawaii is opened on December 23, connection can be extended to any one of these four islands. The inter-island service equipment and the terminal equipment for the Hawaiian end of the transpacific system is owned by the Mutual Telephone Co., Ltd., Honolulu, Hawaii.

The transmitting and receiving stations in Hawaii for the Hawaii-mainland service will be owned and operated by the Radio Corp. of America. The transmitting and receiving stations in California, and distribution in the United States, will be owned and operated by the American Telephone & Telegraph Co.

Hawaii's Inter-Island Service.

The history of Hawaii's new communication system dates back to 1908 when J. A. Balch, now president of the Mutual company, first heard spoken words transmitted by radio telephone at the Barbers Point wireless telegraph station of the company. This voice communication originated from the U. S. battleship fleet then anchored in Honolulu harbor, 16 miles away.

It was that incident which gave Mr. Balch his idea. In 1909-10 the old Mutual Telephone Co. was reorganized. With this, and the idea, as a basis, Mr. Balch began.

In 1911-12 the Mutual company acquired the Hilo Telephone Co., Hamakua and South Kohala Telephone Co. and the Kona-Kau Telephone Co., and set about rehabilitating these old systems, building them into a wire network which extended to all parts of the island of Hawaii. In 1918 the Maui Telephone Co. was acquired, and in 1929 the Kauai Telephone Co., both of these organizations being rehabilitated.

During the early part of the current year the small wire plant of the county of Maui on the island of Molokai was acquired, and a complete new telephone system was established covering even the most inaccessible points there.

But to return to the problem of connecting these wire systems by the spoken word in spite of the depths of the sea channels separating the several islands. In 1912 Mr. Balch, with the authority of his board of directors, went to the mainland to ascertain if the project was possible through the medium of deep sea cables.

As a result of painstaking preliminary surveys, the Mutual Telephone Co. came to the conclusion, in 1916, that cable connection between the islands was impossible. The inter-island channels are too deep and the construction cost too great.

Radio-Telephone Tests Between Islands.

President Balch now recalls the radio tests of 1924 and 1925, which cost $20,000, and the tests of 1928, which cost $18,000, and points out that in those days of preliminary trials, when nothing was certain as to the future of the project, the company's directors backed him to the limit.

It was the tests made in 1928, however, in cooperation with the Radio Corp. of America that proved that successful communication could be carried on between the islands. Experiments in the ultra-high frequency spectrum were made and, on a frequency of 60,000 kilocycles, such remarkable results were obtained between Oahu and the islands of Molokai and Maui that more elaborate tests were deemed advisable.

The long circuit from Oahu to Hawaii had been pronounced an impossible achievement by the research investigators elsewhere as all previous tests had indicated the "visual range" of 134 miles was the transmission limit. The distance from Manawahua, on the eastern slope of the Waianae Mountains to Waiki, on the western slope of Mauna Kea, is 190 miles, or 56 miles beyond the "limit."

It is the fact that each one of the sending and receiving stations is located in the same plane which has made Hawaii's new radio telephone system physically possible. Waiki, Hawaii, at 6200 feet above sea-level; Honuaula, Maui at 2,200 feet; Manawahua, Oahu, at 1,650 feet; and Kalepa, Kauai, at 260 feet, are level with one another. Also, Manawahua, on the same island as Honolulu, is the only hill on Oahu with no other land body between it and the Kauai, Maui and Hawaii stations.

Alignment of Antennae.

Mathematically exact surveys have enabled the perfect alignment of the sending and receiving antennae at each of these four stations. With the delicate instruments thus located in the same vertical and horizontal planes, the chief difficulty was surmounted.

There remained only the problem of creating new types of sending and receiving equipment designed for ultra-frequency, short-wave channels. This service was voluntarily assumed by the Radio Corp. of America.

The ganglia or nerve centers of the new radio telephone service, in the main offices at Honolulu, and at each of the sending and receiving stations on the isolated hilltops on all the islands have been constructed on a scale which will amply care for this service for the next ten years.

At the beginning and until the service is in tune and the resident operators trained, four of the company's "key-men" will be on 24-hour duty at the hilltop stations: W. I. Harrington at Manawahua; Roy Macartney at Honuaula; Douglas Guild at Waiki; and Frank W. Westlake at Kalepa.

The equipment at each of these outside stations is identical. The sending and receiving instruments are in double-insulated copper sheathed rooms of buildings built according to the most recent radio engineering designs, under temperature and humidity control.

In the Mutual Telephone Co. building in Honolulu are two switchboards side by side. In some respects they represent the ordinary telephone switchboard. But one of them will be used for the handling of inter-island radio telephone calls. The other will be used, when the time comes, for Hawaii-mainland radio telephone calls.

Cost of Inter-Island Service.

Including the 1925 and 1929 field experiments, the entire cost of this project probably will exceed $350,000.

While every effort has been made in the construction of the stations on Kauai, Maui, Hawaii and Oahu to keep the operating expense at a minimum, it is believed that an earning power of something over $100,000 a year will be found necessary to cover the cost of obsolescence and depreciation and all operating expenses, including also a return of 6 per cent on the capital invested in the system.

For conversations between Hawaii-Oahu, Maui-Oahu, Maui-Hawaii, Kauai-Oahu and vice versa, there is a minimum charge of $3 for three minutes, with $1 for each additional minute. On conversations between Kauai-Maui and Kauai-Hawaii and vice versa, the charge is $5 for three minutes with $1 for each additional minute.

The company is desirous of keeping rates as low as possible and at the same time earning a reasonable amount on its invested capital. However, a correct balance between earnings and expenses can be ascertained only by an actual trial.

In calling other islands automatic subscribers will call "0" as for long distance and ask for "Inter-Island Service." Country subscribers on all islands will simply call the nearest exchange operator and ask for "Inter-Island Service."

Connecting Companies in Toll Program

How and to What Extent Connecting Companies in Pennsylvania Are Involved in the Bell Program for Improved Toll Service—Address Presented Before Annual Convention of the Pennsylvania State Telephone & Traffic Association

By J. T. Harris,

Vice-President and General Manager, Bell Telephone Co. of Pennsylvania, Harrisburg, Pa.

There has been under way for the past ten years, a program of toll service improvement. This program is very active today and if our present expectations are realized, will not be completed for a number of years to come. It is a program which rather naturally started with our largest metropolitan areas and, radiating from these points, has been rapidly extended to the smaller centers.

For a fair view of the extent to which the connecting companies are involved in this program we must, almost, of necessity, follow its historical developmen I shall start, therefore, with the program at its inception, trace its developmen to the present, together with the relations of your companies to that program, briefly outline the status of today, and the plans for the future. I shall finally indicate how closely your plans and ours tie together both now and in what we have ahead of us.

Back in 1915, with the opening of the transcontinental line, there was introduced the use of the vacuum-tube repeater which was very largely to change the history of our toll development. The application of this particular equipment removed at once the limits within which people could talk. Telephone users, wherever located, became, in effect, neighbors by the possibility of direct communication with one another.

The public was quick to realize the value of the extended speech areas. It was essential, therefore, that we in turn look carefully into the future in order that we might have a toll plant both in amount and physical requirements ready to meet this ever increasing demand for a more extended range of conversation.

In His Address Before the Pennsylvania Convention, Mr. Harris Discussed in Full the Development of the General Toll Switching Plan by Both the Bell System and Independent Connecting Companies.

During the next succeeding years with their war-time problems and in the years following the war with their rapid industrial expansion, we had all we could do to handle the situation with our heavily-loaded plant, delay in relief, and impaired personnel. It was not until 1920 that we had placed back of us these serious problems and were in a position to look forward toward a well defined program for the improvement of the toll service.

The year 1920 becomes then the real starting point for the program of toll improvement which I wish to cover. That we may all have the same ideas in mind, it is worth while to dwell for a moment on the outstanding features of the toll service at that time. These features rather naturally divided themselves into those which were outstanding from the public point of view and those others which concerned, more particularly, the telephone companies.

From the public point of view, there is perhaps first the extent of service. The service at that time was limited to the United States and Canada. Even within this area we were not in a position to give service from any particular point to every other point. Our attention had rather been concentrated along these routes where the business offered was very appreciable.

The second feature from the public point of view is the speed of service. At that time, it required a little over 11 minutes on the average for the completion of a toll board call. Briefly, this meant that the customer received service not immediately upon request, but at such time as we were in a position to furnish the service. Put in other terms, the customer, after placing his call, was dismissed and recalled when the call was completed in practically every instance.

The third feature from the customer's point of view, was his ability to talk with ease after the connection was completed. This ability to talk, which we express as transmission, had been receiving a great deal of attention and was, no doubt, reasonably satisfactory for the conditions to be met at that time. Such were the features

		1920	1931
TOLL BOARD	SUBSCRIBER DISMISSED	100 PER CENT	14 PER CENT ON ACCOUNT OF A NO CIRCUIT AVAILABLE B EQUIPMENT LIMITATIONS C SPECIAL INSTRUCTION CALLS D INTERNATIONAL CALLS EXCEPT CANADA E DELAY SECURING REPORT
	OPERATION	1 A OPERATOR 2 RECORDER 3 MESSENGER 4 LINE OPERATOR 5 TOLL SWITCH OPERATOR 6 TERMINATING TOLL CENTER OPERATOR 7 CALLED STATION ANSWER 8 CALLING STATION ANSWER 9 CONVERSATION	COMPLETION RECORDING TRUNKS-DIAL OFFICES 1 RECORDING AND TOLL OPR 2 TERMINATING TOLL CENTER OPERATOR 3 CALLED STATION ANSWER 4 CONVERSATION
A-B TOLL	EXTENT	20-25 CENT LIMIT	50 CENT LIMIT

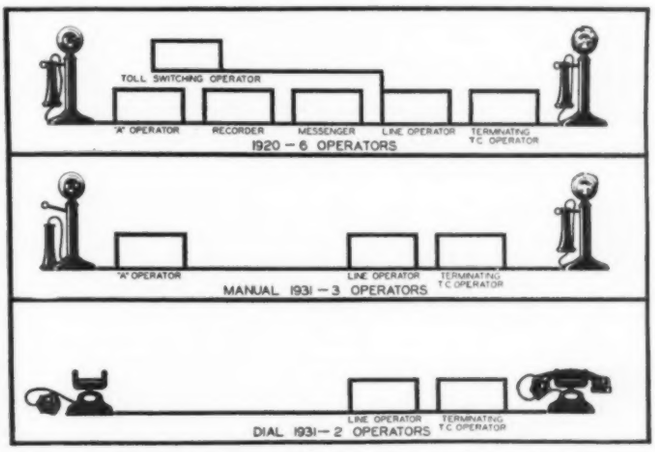


Fig. 1. Comparison of Operations Required on a Toll Call in 1920 and 1931—Fig. 2. Progress in Method of Handling a Call Since 1920.

from a public point of view of our toll service in 1920.

From a telephone company view, as indicated before, there were certain other outstanding features. First among these was the volume of traffic which the public originated in the light of its reactions to our service. In 1920 we, in Pennsylvania, were handling in round numbers in the course of the year, 43,000,000 toll messages. In spite of what we might thus regard as a large amount of business, we were completing approximately only 81 per cent of the total calls offered.

The possible revenue from the other 19 per cent was lost insofar as you and we were concerned. This business was being handled, in the main, over an open-wire plant which, as we all know, is not storm-proof and in the heavy storm areas of Pennsylvania, does not provide the security of service toward which we are aiming as an ultimate.

Taking the customer viewpoint and the company viewpoint as a whole, I may have appeared to paint the toll service as not particularly good. Such, however, is not the intent.

The toll service at that time was, I believe, as good as other services being rendered the public. It may indeed be said that it fairly met the needs of the time. However, if we are to look at any service from the point of view of improvement we must consider those things which are susceptible to improvement, and that has been the intent.

Standing then, at 1920, we were offering the kind of toll service just outlined. Furthermore, we had definitely to determine what our aim in this respect should be for the future. There were at least two distinctly divergent programs which we might follow:

As a very non-aggressive program we might elect only to so improve the toll service as to avoid customer complaints. Such action would be obviously weak and would produce a service not in accord with the vigorous industrial program that might be expected throughout the state.

As an alternate and a very aggressive program, we might choose to make the toll service as good as it is practicable to make it. This would mean that we should steadily improve those features of the service with which the customer has particularly to do, such as, extent of service, speed of service, immediate availability, and ease in talking or transmission.

It is obvious that any such improvement must, of necessity, involve expenditures and that these expenditures will be justified only insofar as a stimulated usage of toll facilities provides a corresponding increase in revenues. Such a program is one then, in which we are not in a position to finally set the limits at the outset. The public will be the final judge.

It was this aggressive program for toll service improvement which was undertaken in 1920. It called for heavy expenditures over a long period of years and for a close observation of the growth in business to determine whether or not the expenditures should be continued. Following this program during the past 10 years, we have made vast changes in the extent of our service, in its speed, in its immediate availability, in the ease of talking, and in its security.

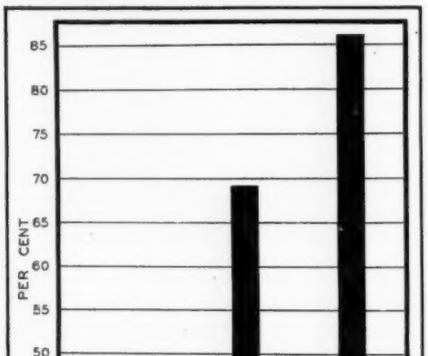


Fig. 4. Comparison of Per Cent of Customers Held at Telephone on Toll Board Calls in 1925, 1928 and 1931.

That we may visualize how much has been accomplished, we shall look at the results first, as at the outset, from the customer viewpoint.

Taking first the extent of service, we are in a position to talk today from the United States to a large part of Europe and to certain areas even on the opposite side of the earth. The service is, therefore, rapidly becoming actually worldwide.

The difference in the manner of handling the customer in 1920 and in 1930 is outstanding. This is indicated by Fig. 1.

On toll board operation in 1920, 100 per cent of the subscribers were dismissed—certainly remote from the challenge of a neighborhood service. Today approximately 86 per cent of our customers remain on the line after filing a call with the toll operator, the percentage of dismissals being reduced from 100 per cent in 1920 to about 14 per cent today.

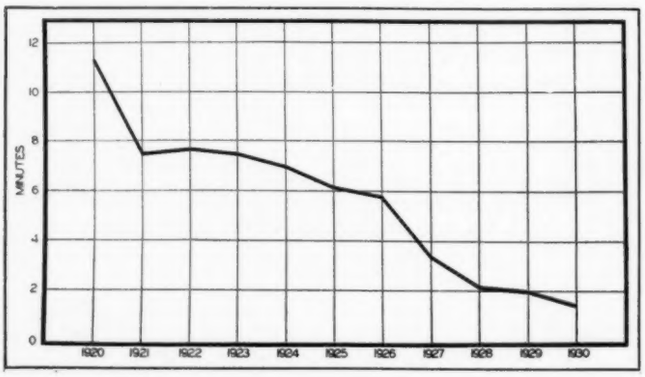


Fig. 3. Graphical Illustration of Increase in Average Speed of Toll Board Service During Past Decade.

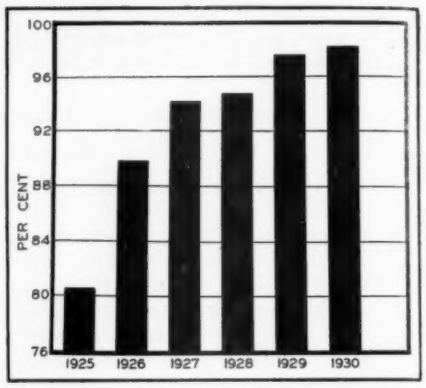


Fig. 5. Per Cent of Toll Calls on Which Transmission Was Satisfactory.

In 1920 there were a number of special types of operating methods. Each one of these types introduced features which, from the customer's viewpoint, were different and though for the time being necessary, were undesirable. In 1931 we have no special methods of operation except in connection with transoceanic, ship-to-shore, moving train, and Mexican service.

Prior to 1920, we had recognized the economies and service improvements accruing to the customer by making it possible for toll connections to nearby points to be handled by the local operator and in a manner comparable with that which the customer received on calls between one local exchange and another. Traffic of this kind, however, was restricted, although the amount involved was of significant size.

In 1920 there were probably few cases in which this kind of service was rendered to points where the toll rate was in excess of 25 cents. By 1931, where transmission permits and circuit groups of sufficient size are available, these limits have been extended to points carrying a station-to-station rate of 50 cents and in some cases beyond the 50-cent limit.

As a second feature of toll service improvement, the progress since 1920 in the manner of customer treatment at the toll board is shown in a direct manner by Fig. 2. In 1920, six operators were involved in the completion of the simplest type of toll board call. In 1931, on the same type of call, only three operators are required at manual offices, and only two at dial offices.

Taking our overall toll situation and combining toll calls handled in Pennsylvania at the local and toll boards, of the 8,500,000 calls handled in April, 1931, only 250,000, representing approximately 3 per cent of the total, showed that the customer was released. In other words, at

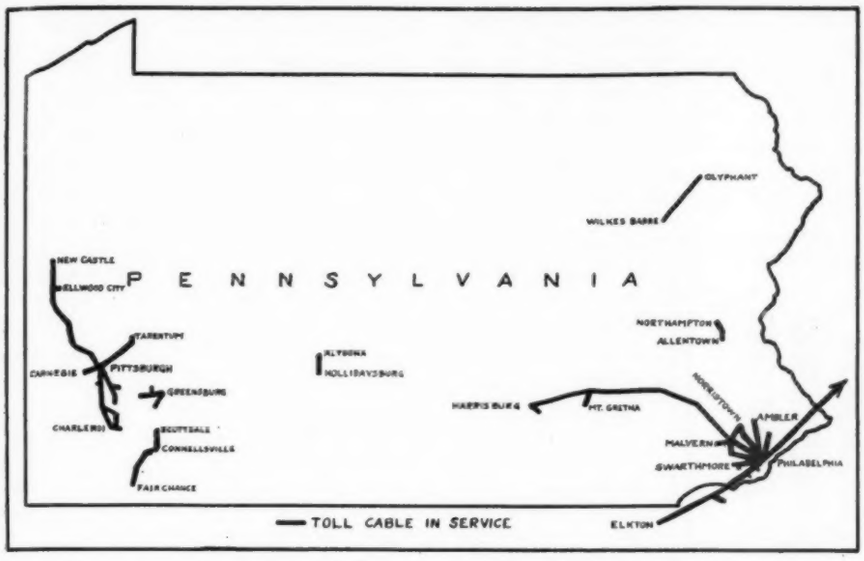


Fig. 6. Extent of Bell Telephone Co. of Pennsylvania Toll Cables in 1920.

the present time in Pennsylvania the customer remains at the telephone for completion of his call on approximately 97 per cent of the entire toll traffic.

The progress made in speed of toll board service during the past eleven years is indicated graphically by Fig. 3. The improvement between 1920 and 1931 directly reflects the intensive drive throughout Pennsylvania for improvements in toll service. This program called for better training of supervisory and operating forces and better toll office administration.

About this time our more congested circuit groups began to be relieved and a moderate recession in business activities following the postwar expansion also assisted in getting better control of the situation.

The next four or five succeeding years showed but slight improvement although there was no noticeable falling off in speed of service. This period showed no major changes in operating methods. Office delays in distribution between the recorder and the line operator accounted for a large portion of the time for completion.

During 1926 and 1927 there was a rapid expansion of a new operating method which called for holding the calling subscriber on the line while his call was being completed, known to us all as CLR operation. Our company took a progressive attitude in the application of this method. In fact, Philadelphia was one of the first of the larger cities to use the method, having started it in a small way as early as the spring of 1925.

The years 1929 and 1930 have practically seen the elimination of operating methods by which the customer is dismissed. It has also found our operating people centering attention on improved speed for connections reached through two or more intermediate offices.

During the last few years improvement in the speed of service may also be attributed in part to improved equipment arrangements and to better operating performance. In addition, our customers have become more fully acquainted with our methods of doing business. This has resulted from advertising, direct instruction work by P. B. X. and dial instructors, and through contact with the operator on the line.

We have gone a long way with an average speed of service of 11.3 minutes in 1920 to an average of 1.5 minutes in 1930.

As another feature of the service from the customer's viewpoint, in 1925, as shown by Fig. 4, we were holding none of our customers at the telephone on calls handled at the toll board. This was increased to practically 86 per cent by 1931.

The progress in improvement of transmission which the customer receives is indicated graphically by Fig. 5. Ten years ago our toll service was confined to the United States and Canada; today it is available to Mexico, Cuba, many European countries, certain cities in South America, and points as far removed as Java, and further extensions are in sight.

In 1925, by our standards of measurement, transmission was considered faultless in Pennsylvania on 80.5 per cent of the conversations observed. By faultless transmission we mean that the customer can talk with satisfactory volume and clearness of tone, and also with freedom from noises and interruptions on the circuit, such as cross-talk, ringing, and operator interference. We find by 1930 that 98.2 per cent of the conversations can be regarded as faultless.

Plant and engineering efforts in respect to our Pennsylvania plant have brought about a fine improvement in transmission. Our plant department has made large contributions through preventive maintenance activities and prompt clearance of trouble. We have also been able to obtain good cooperation from the connecting companies in improving their own toll circuits and local plant conditions.

Transmission is one of our major problems. It is being supervised by the existence of general office and field committees comprising representatives of the several operating departments and including members from the general engineering group, and also the connecting company supervisor. Each case of poor transmission comes under the scrutiny of this group, and constructive action is developed.

Faultless transmission on 98 per cent of our connections, however, is not an indication of work practically finished. We cannot afford to misinterpret these figures. Many of our transmission difficulties are definitely allocated to certain well-defined sections of plant. These isolated cases of poor transmission loom large in the minds of customers who are required to use these services. They are aggravated by com-

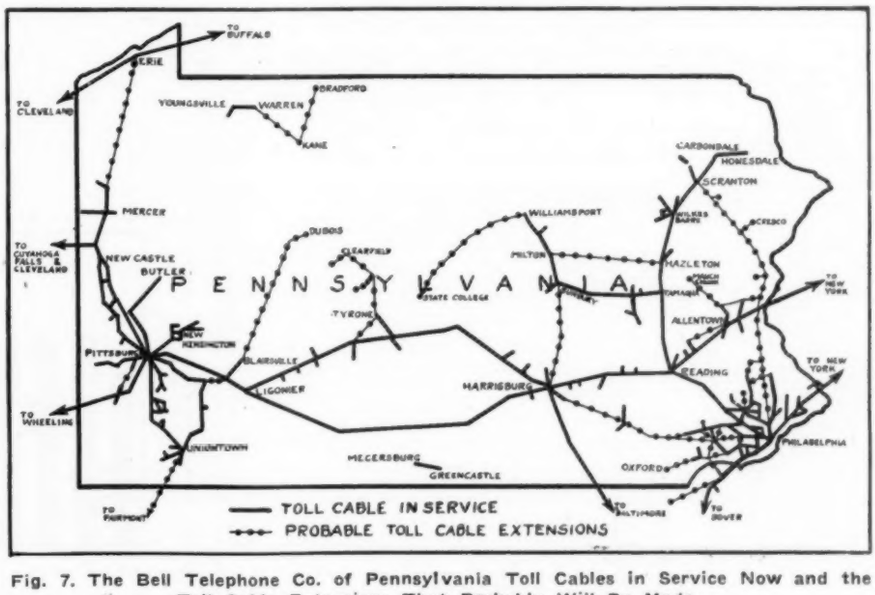


Fig. 7. The Bell Telephone Co. of Pennsylvania Toll Cables in Service Now and the Toll Cable Extensions That Probably Will Be Made.

parison with service where transmission is faultless.

It may be that in some cases we are not aggressive enough in clearing up transmission difficulties, anticipating that these conditions will naturally go out of the picture with the introduction, possibly of a toll cable or a complete rebuilding of open wire plant, which in some instances may not be programmed for the immediate future.

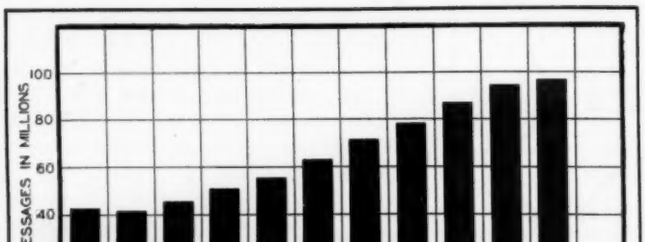


Fig. 8. The Bell Telephone Co of Pennsylvania Total Toll Messages from 1920 to 1930 (A–B Toll Included).

Further, where poor transmission exists there may be a tendency to refrain from any attempt to study individual cases and to effect some sort of relief. It may be of interest to state that one of the companies in studying the possibilities of action in connection with chronic conditions found that on approximately 20 per cent of the troubles there were other factors contributing which, if eliminated, would have improved transmission even though many objectionable features remained.

The correction of chronic conditions in many cases is controlled by the expense necessary to make improvements. Possibly in some instances the cost overbalances the effect of continued impaired service on customer relations.

We cannot afford, however, to neglect individual cases of poor transmission where chronic bad conditions exist. Efforts should be sustained in keeping such plant on the best possible basis and in preventing further deterioration.

Turning to the change in the physical aspects of the plant, Fig. 6 shows the extent of the toll cable in Pennsylvania in 1920. It is presented in order to bring clearly before us the extent of the toll cable development that took place between 1920, as shown by this chart, and 1931 as shown by Fig. 7.

It is very clear that the security of service and the increased number of circuits which have made possible the improvements which we have just seen on the other charts, were not obtained without very real expenditures.

From this view of what we have done to improve our service from a customer viewpoint we turn now to the company viewpoint. We wish, particularly, to know how the increase in messages has reacted to the money we have spent.

There is indicated by Fig. 8 the trend in toll revenue producing messages which shows an increase of 112 per cent in ten years. Here we see the favorable reaction of the public to the expenditures that have been made and the improvements in service that were offered, or what is more to the point, the justification for these improvements.

As the next feature, Fig. 9 indicates the improvement in toll board completion. Major improvements in toll board completion were reflected in a marked manner during the first two years subsequent to 1920, coincident with the improvement in speed. Since 1923 the improvement has been more gradual.

Pennsylvania results would seem to indicate a falling off in this respect during the years 1928 and 1929, but this is accounted for primarily by a change in operating methods at Philadelphia and Pittsburgh.

Some further slight improvement in our toll board completion may be made, but whatever methods are introduced will have to be tempered by avoidance of conditions such as too closely following up calls, which may be annoying to the customer.

Taking this chart as an indication of accomplishment in Pennsylvania, the toll board completion has arisen from 81 per cent in 1920 to 91.5 per cent in 1930.

Revenue without question has an important bearing on our view of the results. There is shown in Fig. 10 the average revenue per message during the past 11 years. Rate adjustments were made in 1920, 1924, 1926, 1927, 1929 and 1930. However, the 1927 and 1929 rate reductions had little effect on the average revenue per call.

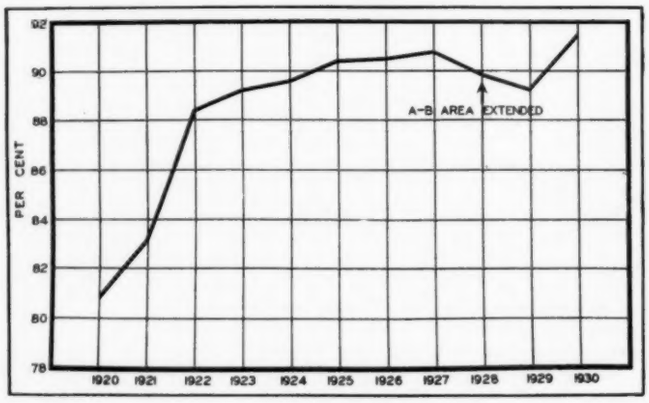
Prior to 1926 there was an increase in revenue per call, reflecting not so much the increase in length of haul as in length of conversation. In 1926 there was a marked increase in the average revenue, due primarily to transfer of longer haul traffic within the state from the A. T. & T. Co. to the Bell company of Pennsylvania.

Briefly, these charts show that real and extensive improvements have been introduced during the past 10 years into the features of toll service which affect the public directly and that these improvements have, we believe, in turn been fully justified by the toll usage which they have stimulated.

Such a program, with the results which we have noted, cannot help but have a very direct effect on the companies which you represent. More and more during the past 10 years we have been delivering to you and have been in a position to receive from you, a high speed toll service carrying with it an increased possibility of completing all business that is offered.

You have, no doubt, felt through your own public contacts and through our joint consideration from time to time of our common problem, the necessity for additional toll circuits, more toll board, faster operating, and a more extensive holding of the customer on the circuit until the call is completed. This is a natural effect which neither you nor we can well avoid.

It definitely brings home to both of us the fact that toll service rests with the group as a whole; that if we are to realize as a group the increased revenues which the past 10 years have indicated as



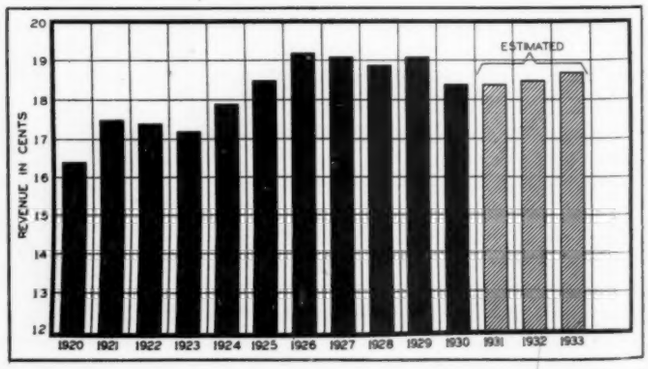


Fig. 9. Improvement in Toll Board Completion During Past Decade—Fig. 10. Bell Telephone Co. of Pennsylvania Average Revenue Per Message.

possible, we must also provide the facilities that will stimulate this growth. This has been realized to the extent that some of you have even now found it necessary to start the conversion of your open-wire toll plant to cable plant, to make use of repeaters and to establish a more rapid toll service.

As a part of this same improvement of toll service, we now have actually underway the introduction of what we call the general toll switching plan. This plan has a double purpose—the reduction to a minimum of switching points on long distance traffic and the improvement of transmission and efficiency on all toll calls.

That we may see what this change means for the present as well as for the future, we must look backward for a moment over the development of our toll business. As this business has grown we have established direct toll circuits between various towns and cities.

However, there have been many instances where business was insufficient to warrant a direct circuit so we reverted to a more roundabout means of connection. In these cases we selected the shortest existing toll route and connected the intermediate circuits together by cords at the switching points, thereby establishing the overall connection.

It was in this way that the vast network of toll lines throughout the state had grown until there were calls which necessitated many switches and the connecting together of many comparatively short circuits. Without going into too much detail, this business handled in this way had brought with it certain difficulties, largely of two kinds.

In the first place, it is impracticable to make the transmission on any particular circuit better than a certain minimum, especially if it is a circuit requiring the use of a repeater. Where, therefore, connections are built up from a series of circuits, there is a definite limit to the transmission which can be given.

The second difficulty in such a series of circuits lay in the number of switching points, for no matter how careful we might be, these switching points must consume time in completing a call with a consequent delay to the subscriber and also be a source of impairment to the service.

It was out of these circumstances that the general toll switching plan has developed. A typical application of this plan is shown by Fig. 11. The first step was a selection of eight major toll centers well distributed throughout the Bell System.

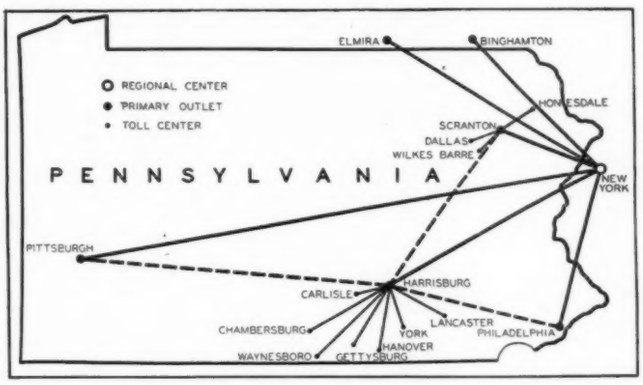


Fig. 11. A Typical Case Illustrating the General Toll Switching Plan in Pennsylvania.

The points selected for these centers are New York, Chicago, Atlanta, St. Louis, Dallas, Denver, Los Angeles, and San Francisco. From each of these points, designated regional centers, there will be a circuit or group of circuits to each other regional center.

Next in importance to the regional centers there have been selected what are designated primary outlets scattered throughout the country. These primary outlets will be much larger in number than the regional centers and will be chosen, in general, from certain of the existing toll centers. Each of these primary outlets will have a direct circuit to at least one of the regional centers—usually to the nearest. Finally, grouped about each primary outlet are its nearby toll centers.

The circuits connecting the regional centers may be regarded much as a nationwide system to which each toll center would have access by switching through its particular primary outlet. It is true, too, that by no means all calls would flow through the regional centers, for where two toll centers are connected to primary outlets—for example, in the same state—calls between these toll centers would flow via the respective primary outlets and the circuits connecting them.

For Pennsylvania, the primary outlets now in service are Harrisburg and Pittsburgh, with Scranton to be cut in service this year. Philadelphia, which presents a very difficult problem, will follow some time in the future. The plan as outlined so far evidently has for its purpose the directing of our switched toll business through definite and high-grade channels.

In addition, the general toll switching plan involves an improvement in transmission over what has been offered heretofore. For this purpose repeaters were placed on circuits which had not previously been so equipped. Another equally important and new type of equipment has also been connected to each circuit on those high-grade channels which will be used for switched business.

This piece of equipment is termed a pad and from it comes the general name of "pad control." Essentially this pad is a device located in the central office, introducing a certain amount of transmission loss into a circuit and is connected to the highest grade circuits so as to make these circuits suitable for handling calls for terminating business.

The necessity for these pads arises in this way. The circuits connecting any two towns are required to handle two types of business. There is that business which originates in the first town and terminates in the second, called terminating business. When compared with switched business such traffic is short-haul and may be handled over less expensive trunks which give a greater transmission loss than may a circuit for switched business.

As a matter of fact, where the terminating business is sufficient, we provide circuits in the group between the two towns designed primarily to carry this particular traffic. The transmission loss on these circuits would be too high as a rule to make them suitable for handling the switched business.

There is the other type of business carried by a circuit group, namely the switched business. This requires circuits with a much lower loss than is afforded by a terminating circuit. Obviously it would be economical to use these higher grade circuits for terminating business when they would otherwise be idle. But in many cases if an attempt were made to use these high-grade circuits without reducing the high volume of transmission which they afford, singing and howling on the line would frequently result.

This difficulty has been overcome by introducing into the circuit equipment known as the transmission pad which on terminal calls has the effect of reducing the volume of transmission. This device eliminates the singing and makes the circuit, insofar as transmission is concerned, equivalent to a normal terminating circuit. Thus, these circuits designed primarily for switched business can be used for terminating business as well.

However, when two high-grade circuits are switched together to handle switched business, the pads on both are automatically cut out of the circuits, and approximately the highest grade of transmission which the circuits can give, is thus established. The net result is that a circuit is required and designed to do two things.

The other outstanding features, then, of the general toll switching plan, are the automatic modification of the higher grade circuits to handle either terminating business or switched business, and a very material improvement in transmission.

This plan which is now under way will not be completed for the state of Pennsylvania until Scranton and Philadelphia have both become primary outlets and every toll center in the state is connected to at least one primary outlet. The plan involves, then, a continuous growth over a period of years.

With this view into the future of the toll service improvement now under way, there is bound to be the same close tie between our services that there has been in the past.

To keep pace with this improvement, which naturally would be applied to our own larger centers first and then be extended to our smaller centers, we shall, no doubt, have to add toll board, repeaters and toll cable to replace open-wire lines as they become congested. This same demand for service and the gains in toll traffic which can be realized from meeting the demand, will, therefore, apply directly to the business which we are handling jointly, just as it applies to business that happens to be entirely under Bell company control.

You, as well as we, cannot help but feel the effects, as registered by the public viewpoint, of this improved service which will be expressed in terms of greater speed, fewer interruptions, and greater ease in talking on our switched calls.

I believe, therefore, that you, too, in the next few years, assuming of course that this increased traffic is as attractive to you as it has been to us, will be faced with expenditures for toll cable, repeaters, and central office equipment, comparable to ours in corresponding locations and I will leave this with you as a final thought.

It is only as we jointly take full advantage of the experience that is being developed and provide a service which anticipates the needs of the public that we, as a group, can fully secure the potential revenues that await us.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Oral Argument Before Interstate Commission in Tri-State Sale.

Opposing the merger of the Bell and Tri-State telephone companies, Louis Anderson, corporation counsel for the city of St. Paul, appeared before the Interstate Commerce Commission in Washington, D. C., on December 1 and requested that the commission delay its decision until the Minensota Railroad and Warehouse Commission has completed its valuation of the Tri-State property.

The hearing developed an argument as to who will bear the burden of the additional $9,000,000 to be paid for the Tri-State company, an amount which Special Examiner H. C. Davis insists is a bonus above the real value of the property.

Charles M. Bracelin, general counsel for the American Telephone & Telegraph Co., argued that the conclusion of Examiner Davis that the $9,000,000 in excess of value would not be in the public interest, was not based on sound reasoning. He said that Examiner Davis admitted the merger would give better service, and held that the loss for payment of the excess of value would fall upon stockholders and not on the public.

Mr. Anderson argued the cost for this additional valuation would have to fall somewhere, scouted the idea it would fall upon the stockholders, and insisted that inevitably it would have to be carried by the telephone users as a basis for making rates. In reply Mr. Bracelin insisted the improved service would be so marked that the bonus price would not matter.

Change of Venue Granted in Terre Haute, Ind., Rate Case.

Following argument between Gilbert Gambill, representing the Citizens Independent Telephone Co., and Charles Crawford, Leonard Kincade and Charles Whitlock for the city of Terre Haute, Ind., and other petitions for a revocation of a local telephone rate increase, Special Judge Charles Bedwell on December 7 in Terre Haute granted a change of venue in this case.

Petition for the change of venue was filed by John Masselink and others, who are parties plaintiff with the city of Terre Haute. Objection was filed by the telephone company and overruled.

By agreement of counsel, Rockville, Ind., was selected as the place to continue the suit. Ten days were given to make the change.

The city of Terre Haute brought suit against the Indiana Public Service Commission shortly before the end of 1929 while Ora D. Davis was mayor and Miller Davis city attorney. Progress of the case since that time has been through numerous closely-written docket pages of court rulings on various legal moves and countermoves.

The rate increase obtained by the telephone company, according to the city, was granted on erroneous showings of invested capital in that the property was overevaluated. The city council at one time turned down a requested appropriation for assistance to the city attorney in checking up on these evaluations.

Orders Refund of Unapproved Switching Rate Increases.

The Remer Rural Telephone Co., of Boy River, Cass County, Minn., has been ordered to refund charges made in excess of rates filed with the Minnesota Railroad & Warehouse Commission. Complaint was filed by P. Pichotta and H. E. Countryman, farmers residing within six miles of Boy River.

The Remer company operates exchanges at Boy River and Remer and also performs station switching service for a number of township telephone systems, including the Boy Lake and Rogers township systems which furnish service to the complainants.

Prior to May 1, 1931, the monthly rate charged for switching service by the Remer company at its Boy River exchange was 25 cents per subscriber. It was then raised to 50 cents. On July 1, 1931, the rate on the Rogers line was raised to 50 cents.

While these increases in switching rates were intended to cover switching service from both the Remer and Boy River exchanges, they were made without first receiving the approval of the commission as required by law. The complainants further stated that Boy River is their principal trading center and that they have no use for service through the two exchanges, one exchange being sufficient.

The portion of the law applicable in this case states: "No rates filed with the commission shall be changed by any telephone company without an order of the commission sanctioning the same." For this reason the increases were ordered refunded from May 1 on the Boy Lake line and from July 1 on the Rogers line.

Tri-State Hearing by Minnesota Commission in February.

Upon motion of the city of St. Paul and the office of Attorney General Henry N. Benson, the formal hearing of the investigation of the Tri-State Telephone & Telegraph Co., was postponed until February 2 by the Minnesota Railroad & Warehouse Commission. L. P. Sheahan, first assistant corporation counsel of St. Paul, Charles E. Phillips, deputy attorney general, and C. B. Randall of St. Paul, president and general counsel of the Tri-State Telephone & Telegraph Co., were present at the short hearing on December 1 attended by Commissioners Laurisch and Matson.

Mr. Phillips pointed out he was unable to say at that time how much time would be needed to prepare the case, to build up evidence and check the figures in the commission engineer's report on the valuation of the Tri-State properties.

A sweeping denial of neglect of duty charges preferred by Mrs. Helen O'Brien Kessler, St. Paul club woman, was filed

by the railroad and warehouse commission on December 1 with Governor Olson.

The charges were made on the basis of the commission's investigation of telephone rates in St. Paul. Mrs. Kessler accused the commission of being "lax" in reducing telephone rates. She demanded that Governor Olson conduct an investigation designed to oust the three members of the railroad and warehouse commission.

The commissioners' answer contends that the group has been "careful and diligent" in the exercise of its supervisory powers over telephone companies. It says they are willing to proceed with a hearing on telephone rates in St. Paul when advised by the attorney general and the St. Paul city attorney that they are ready to present evidence.

Facts set forth by Mrs. Kessler should be determined at a rate hearing, it goes on, pointing out that new rates already in effect provide for a "substantial reduction" and that an emergency appropriation of $30,000 has been requested to corroborate findings of D. F. Jurgenson, chief engineer for the commission on a survey of the Tri-State Telephone & Telegraph Co.

In its answer, the commission explained the various delays on the final disposition of the telephone rate investigation from the time it first filed an order requiring the Tri-State company to show cause why a "suitable and proper" reduction should not be made in existing telephone rates in the state until the present hearing.

In her charges against the commission, Mrs. Kessler requested Governor Olson to hold a formal hearing and have the commission show cause why they have not reduced the telephone rates.

Governor Olson submitted the charges to the commission and asked them to file an answer with him at their convenience.

Commission Denies Lower Rates

Subscribers' Application for Reduced Rates Denied—Valuation at Present-Day Prices and Considering Only Property and Materials Actually Used Shows Return of 2.48 Per Cent

The Kansas Public Service Commission, on November 17, denied the petition of subscribers of the Clyde, Kans., telephone exchange, owned and operated by the American Telephone Co., with headquarters at Abilene, for a reduction of rates. The application, filed August 17, asked for a reduction from $1.50 to $1.00 on rural rates and a proportionate lowering of city rates. Hearing was held on October 1. The opinion of the commission which was written by Commissioner Jesse W. Greenleaf, was made a part of the order.

At the hearing the applicants offered testimony of a general nature stressing particularly the low financial revenue of the farmers, due to the very low price of farm products. The opinion was expressed that the price of telephone service should be reduced in keeping with the low prices of farm products generally. Some testimony was offered relative to the rates charged for rural service in some other telephone exchanges.

The commission had directed its engineers to make a complete valuation of the property of the telephone company, using as a basis of values the price of material and labor as of the date the valuation was made. The accountants of the commission were also directed to audit the books and records of the telephone company.

As a result of this investigation three exhibits were prepared and were submitted by the chief engineer of the commission, one showing the present value of the property used and useful in rendering telephone service.

In this exhibit, a building which had been bought by the company, which may be later used for an exchange building, and new property that had not yet been installed, were excluded from consideration. The only property considered was that which was used and useful in furnishing telephone service. The value of such property was found to be $49,661.

Another exhibit showed the revenue received by the company from all sources and the expenses necessary in furnishing telephone service. This report of the accountant found the balance available for depreciation and return to be $4,432.

A third exhibit was introduced showing the annual expense of depreciation to be $3,197, leaving the amount of $1,233 or 2.48 per cent for a return on the present-day value of the property used and useful in furnishing telephone service at the Clyde exchange.

The telephone company's representative made a statement wherein it was shown that the book value, or the actual cost of the property to the present owners, was approximately $51,000, or $1,339 more than the valuation found by the commission's engineers. This amount originated with the cost price of the property in 1924 to which the cost of plant additions has been added, and cost of plant retirement has been deducted since acquisition.

"The value of the property as found by the commission's engineers, when considered with the book value shown by the company, is believed to reflect the fair value of the property," the commission's opinion states.

"Comparison of this exchange with other exchanges leads to the conclusion that there is no greater investment in property than should be prudently invested in an exchange of this size.

The accountants for the commission found no unusual or exorbitant charges for labor. The exchange is apparently being operated as economically as it can be operated consistent with the furnishing of adequate service.

The present rate of return on the value of the property of 2.48 per cent, as shown by the commission's engineers and accounts, reflects a rate of return which cannot be considered more than a fair return.

The United States Supreme Court has defined the method of determining the fair value of public utility property and any rate that might be ordered by the commission which would produce less than a fair return on the fair value of the property would, in the eyes of the law, constitute confiscation.

After a full investigation and careful consideration, the commission, with the above facts in mind, cannot legally order rates in effect which would produce a lower rate of return than that now being received by the telephone company.

The commission finds that the application for a reduction in telephone rates should be denied."

Two Exchanges Discontinued; Free Toll Service Continued.

On November 30, the Kansas Public Service Commission approved the application of the American Telephone Co. of Abilene, Kans., for permission to attach its subscribers at Doniphan, with its exchange at Troy, and to discontinue the exchange at Doniphan.

The American Telephone Co. was also authorized to connect its subscribers at McFarland to the exchange at Alma, and to discontinue the telephone exchange at McFarland.

On the same day the commission denied the application of the Summerfield Mutual Telephone Co., Summerfield, Kans., for permission to discontinue its so-called "free toll line" between Summerfield and O'Keto.

Commission Issues Order Relative to Sarcoxie, Mo., Exchange.

On December 5 the Missouri Public Service Commission issued an order, effective 10 days after date, in response to the application of the Midwest Telephone Co. for permission to make certain changes in rates for service at Sarcoxie, Mo., authorizing that the rate on rural multiparty lines be reduced from $1.50 to $1.25 per month.

The company was ordered to file with the commission, effective the next billing period after effective date, an amended schedule of rates in accordance with the provisions contained in the order.

The commission found that the present fair value of the property of the Midwest company used in the operation of telephone

service is not less than $36,000. It also makes allowances for fair annual depreciation to be set aside; holds that cost of appraisal and audit made by the commission is chargeable against the company as an operating expense and that it shall be amortized over a period of five years.

Rate Complaint Utilized to Cloak Proceeding to Tax Valuation.

The complaint filed last May by members of the local government at Stella with the Nebraska State Railway Commission and charging that the Southeast Nebraska Telephone Co. was discriminating against patrons in that it was charging higher rates for rural service at Stella than at other exchanges named, including Verdon and Barada, and higher for business service that at other named exchanges, has been withdrawn. Considerable discussion was had over the matter, but no formal hearing was held.

When it was learned that the rates at Stella had been fixed after an investigation by the commission some years ago, that it would be impossible to reduce them below the present level, being only sufficient to insure a reasonable return, and also that if any action were taken it would be to raise those at the other small neighboring exchanges, the real purpose of the proceeding was disclosed.

This was to get the commission engineers to make a valuation of the property to be used by the council and county board in raising the taxes of the company. This the commission firmly refused to do, pointing out that it had no relationship to the powers and duties of the commission.

Chairman Randall also took occasion to point out the folly of raising a telephone company's property valuations in order to compel it to pay more taxes. This form of retaliation had been urged by radicals in other parts of the state. Mr. Randall showed the committee in charge of the affair that taxes are a lawful expense charge, that in practical operation they are usually paid by the patron, and that in any case where they were materially increased they could be properly made the basis of an application for increased rates. After that the committee said it would drop the entire matter.

Bell Company Ordered to Remove Toll Pay Station.

On December 10, the Minnesota Railroad and Warehouse Commission ordered the Northwestern Bell Telephone Co. to discontinue its public toll pay station service at Round Prairie, Minn., and remove all equipment necessarily installed therefor. In addition, the Leslie Rural Co-operative Telephone Association was ordered to show cause in a public hearing on December 29, why it should not provide such service.

The proceedings came about as the result of a complaint by the Leslie company that the Northwestern Bell company had invaded its territory, when it installed the toll station on July 18, 1931.

The Leslie Rural Co-operative Telephone Association was originally organized and its plant constructed in 1903, and service is afforded some 675 subscribers. It does not operate an exchange at Round Prairie, but its patrons at that point receive their services, both local and toll, through the exchange at Long Prairie, a larger community some few miles to the north.

The desire of the business interests at Round Prairie and of the residence population generally, for a toll pay station was well known to the Leslie company, the commission stated, but no attempt to provide the service was made by it. The record discloses this organization to be favorably inclined toward furnishing the station at this time. The Leslie company furnishes a grounded circuit service with from 13 to 21 subscribers on each of its four lines out of Round Prairie.

The Northwestern Bell company contended that no revenues are lost to the complainant, and no other method is available for other than Leslie company subscribers to receive toll service. The service now afforded is one which could not be provided by the Leslie company without a similar toll station installation. The Bell company's position was that the station was established in response to public demand and should be allowed to stand.

However, the legal department of the state considered the action of the Northwestern Bell company to be in violation of the law prohibiting a company from entering the territory already served by another. For this reason the commission ordered the withdrawal of the Northwestern Bell toll station.

Associated System Given Approval to Purchase Ohio Properties.

The Ohio Public Utilities Commission on December 8 granted authority to the Ohio Cities Telephone Co. of New Philadelphia to acquire the Ohio Associated Telephone Co., of Marion, and the Freeport Telephone Co. of Freeport. All three companies are operating units of the Associated Telephone Utilities Co., Madison, Wis. The new operating unit, which will be called the Ohio Associated Telephone Co., will serve 26,300 telephones in 94 communities. It will operate 52 exchanges and 1,876 miles of toll lines.

This acquisition is a further step in the Associated Telephone Utilities Co.'s program of consolidation of operating properties within each state area into compact operating units, thus obtaining benefit from economies possible under unified operation.

The purchasing company is permitted to issue $1,484,000 in 5 per cent 30-year gold bonds to be exchanged for a like amount of outstanding 6 per cent bonds of the Ohio Associated Telephone Co.

The company is also authorized to issue 49,549 shares of no par value common stock in exchange for 29,550 shares of the common no par stock of the same company, and the 1,000 shares of the common stock of the Freeport Telephone Co., with a par value of $100 per share.

Bell Cost Data Records at Disposal of Ohio Commission.

Western Electric Co. prices to the Ohio Bell Telephone Co. for telephone installations in Ohio will be made available at the company's New York office, the Ohio Bell company advised the Ohio Public Utilities Commission on December 4. The costs were sought in the hearing of the statewide investigation of the Ohio Bell rates.

Records pertaining to the material costs to the Ohio Bell company, the income tax statements of the Western Electric Co. and the treasurer's records will be made available to Attorney General Gilbert Bettman at any time in the Western Electric offices in New York City, a memorandum filed by Ohio Bell said.

The company declined to compile the information for the commission as requested by the attorney general, but offered to place all its records, covering the period 1916 to 1930 inclusive, at the disposal of any persons sent by the attorney general to obtain the figures.

Withdraw Application for Lower Rates at Charleston (S. C.).

Action brought by a group of people in Charleston, S. C., against the Southern Bell Telephone & Telegraph Co., interested in the development of the west shore of the Ashley river to secure lower telephone rates there has been rescinded, B. H. Barre, rate expert of the South Carolina Railroad Commission, announced.

The commission had set December 1 as the date to hear complaints of the group against tolls and charges of the Bell company outside the base area of Charleston.

Court Records on Everett (Wash.) Telechronometer Case Closed.

A final court order in the Everett telechronometer case was signed on November 30 by Judge John M. Wilson of the Thurston County Superior Court, trial judge whose decision reversing an order of the Washington Department of Public Works ordering out of service the telephone metering devices was set aside by the state supreme court.

Judge Wilson closed the court records of the case by signing an order confirming the supreme court reversal of his decision, and issuing a judgment upholding the department. The order remanded the case to the department for whatever action it cares to take.

The West Coast Telephone Co. disconnected the telechronometer system at the

(*Please turn to page* 41.)

Fallon, Nev., Installs New Switchboard

Progressive Town in Center of Irrigation and Mining Districts Has Improved Service Through New Switchboard Installation by Churchill County Telephone & Telegraph System—Improvement Expenditures—Description of Equipment

By H. A. Arth,

District Manager, Kellogg Switchboard & Supply Co.

Fallon, Nev., and Churchill County of Nevada recently completed another portion of their program to make the city of Fallon and Churchill County the more progressive section in Nevada by installing a new Kellogg 6-800 Masterbuilt switchboard in the exchange of the Churchill County Telephone & Telegraph System.

Fallon, a county-seat town, located in the center of the Newland irrigation project, has a population of more than 2,000 people. It is located on the Lincoln highway and is an important supply depot for the surrounding county, which includes a number of mining districts. The city is supplied with electric current furnished from the government hydro-electric power plant at the Lahontan dam, 16 miles from Fallon. Rural power lines have been constructed by eight local improvement districts organized for that purpose.

Attractive Well-Built Building of the Churchill County Telephone & Telegraph System at Fallon, Nev.

The city of Fallon owns the water system, lighting system and sewerage system. Municipal operation has been so successful that the city has been able to improve its street and public lighting systems with profits realized from its utilities.

There are three large grammar schools and one high school in Fallon. The high school was completed in 1923 at a cost of over $150,000. For a distance of five or six miles around Fallon the country schools have consolidated with the city and school busses run to and from the centrally-located schools.

The county commission that is responsible for these modern conveniences and civic progress consists of Chairman Fred F. Franke, Dr. J. C. Ferrell, and Mapes Ferguson. G. W. Likes is the county clerk.

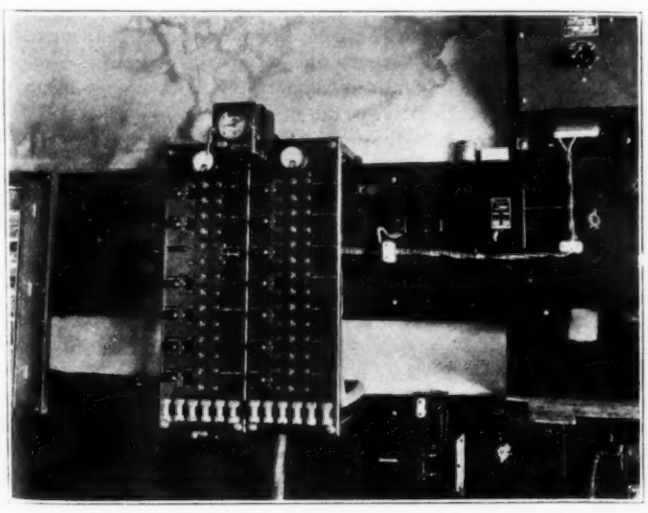
The Churchill County Telephone & Telegraph System is also owned by the county. The system was begun in 1895 when the county purchased an abandoned telephone line and installed five telephones. As the population increased and more people realized the value of telephones in their homes, offices, and stores the system grew larger. In 1903, the first switchboard was installed to serve the ever-increasing number of subscribers.

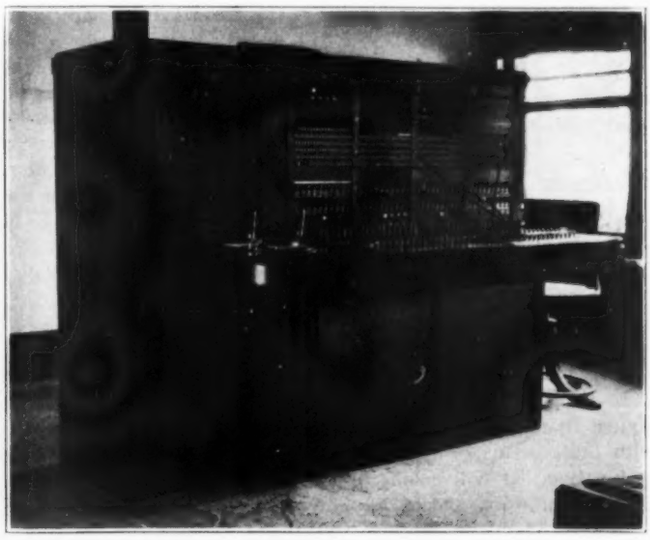
As subscribers increased and the operations expanded, Tom Sanford, superintendent of the telephone system, made many improvements throughout both the interior and exterior plants. The county commission realized that modern telephone service was a real necessity and essential to the future progressiveness of Fallon and the entire county. As a result it decided to obtain new central office equipment.

After considerable investigation, the commission selected a two-position Kellogg 6-800 Masterbuilt switchboard as best satisfying its requirement. Among considerations that were important factors in determining the choice of a Masterbuilt switchboard, was the flexibility of this equipment. There is no expensive rearrangement cost encountered by Masterbuilt exchanges when growth requires additional switchboard capacity.

Here is what Mr. Sanford says about his system's new switchboard:

"Our new 6-800 Masterbuilt Switchboard arrived and we desire very much to express how pleased we are with it. All





View of Converter, Power Board and Other Equipment Installed in the Fallon, Nev., Exchange—New Kellogg Switchboard Recently Installed by the Churchill County Telephone & Telegraph System at Fallon.

statements that you have made about the 6-800 Masterbuilt switchboard concerning appearance, flexibility, low installation cost, are more truth than poetry.

We are proud to advise that the 6-800 Masterbuilt switchboard was cut into service yesterday without any trouble whatever. We have already noticed the speedy operation and wonderful transmission involved in the Masterbuilt board.

These facts were the main reasons for placing our order with you and we just had to express how satisfied we are with our new equipment."

This board is equipped with 320 universal line circuits, 70 rural lines and 10 toll circuits with universal cord circuits, as well as automatic harmonic ringing, calculagraphs, and automatic charging equipment, together with a Kellogg senior-type wire chief's board.

This county-owned telephone system has one of the finest exchanges on the West Coast, and has been making money for quite some time. So far this year, it has made expenditures of over $20,000 out of profits that were earned through the good, business-like methods that the county commissioners and Mr. Sanford have used. The company has over 900 subscribers and serves the whole of Churchill County which has a population of 5,200.

It is surprising to note that there have been no added taxes for the maintenance or improvements of this telephone system. In fact, there was only one assessment, and that was years ago when the system first started.

The new 6-800 Masterbuilt switchboard installation was completed on September 11, and the cutover was made without trouble or interference—a compliment to the excellent work of J. E. Wright, who installed the board.

Considerable credit should be given the county commissioners, as well as to Mr. Sanford, the superintendent, for the fine telephone system they have. These men are business executives who can visualize the needs of the future and so plan their course of action, that the present as well as the future will bear profits from their good judgment.

Overseas Telephone Service Extended to Hawaiian Islands.

Hawaii and the North American mainland will be linked by regular telephone service on December 23, marking the first step in the extension of Bell System overseas telephone service to the Far East. The new service will interconnect all Bell and Bell-connecting telephones in the United States, Canada, Cuba and Mexico with those in the principal islands of the archipelago. It will be the first time the United States and one of its outlying dependencies have been joined by direct voice communication.

The voice path across the Pacific ocean will be over a short wave radio channel between stations near San Francisco and on the island of Oahu. It will be in operation during the greater part of the business day.

The novel type of antenna employed and other interesting details were described in the December 12 issue of TELEPHONY.

Through the headquarters of the Mutual Telephone Co., of Hawaii, in Honolulu the service will embrace all telephones in that company, those on other islands being linked by the inter-island short wave radio system, described in full on page 26 of this issue of TELEPHONY.

The cost of a call between San Francisco and Honolulu will be $21 for the first three minutes and $7 for each additional minute. Calls involving other points will be subject to additional charges proportional to the distance.

Winnipeg-Vancouver Section of Trans-Canada Line Opened.

Direct long distance telephone circuits linked six of the nine Canadian provinces when, on December 14, the new Winnipeg-Vancouver link was opened for commercial use over temporary facilities between Calgary and Winnipeg. This 1,745-mile stretch, bridging the prairies and mountains between the "Gateway of the Canadian West" and the Pacific coast, is the longest direct telephone circuit in the Dominion. Its completion, even on this temporary basis, marks an important step toward the early opening of the Trans-Canada telephone system from coast to coast.

By means of this new Winnipeg-Vancouver line and the existing Montreal-Winnipeg and Toronto-Winnipeg links, all Bell of Canada telephone users in the provinces of Ontario and Quebec have been brought within direct voice-reach of British Columbia telephones over all-Canadian telephone channels.

Almost 16 years ago, in February, 1916, the first telephone call passed between Montreal and Vancouver. It was routed largely through United States telephone circuits and required switching at various points en route. It marked, however, the opening of a new epoch in long distance telephony at that time.

Very soon in the new year, the temporary facilities now in use between Calgary and Winnipeg will be replaced by permanent carrier-equipped circuits providing a number of simultaneous conversations over the entire route.

Since December 14, all subscribers of the Bell Telephone Co. of Canada in Ontario and Quebec where that company operates, have been enabled to talk with British Columbia or other western Canadian telephones over circuits located entirely within the Dominion. Over the new all-Canadian route, calls between Quebec and British Columbia are switched only at Winnipeg. The new Winnipeg-Vancouver facilities also eliminate the former need of switching Manitoba-British Columbia calls at Calgary, Alberta.

Formerly, these calls left Canada at Windsor, Ontario, via submarine cable under the Detroit river. From Detroit they passed westward and required to be switched at Chicago and at Helena, Mont., if destined for Saskatchewan or Alberta. On calls from eastern Canada to Vancouver or other points in British Columbia, switching at Seattle, Wash., was necessary.

Seizure of Telephone System by Spanish Government Urged.

In a bill introduced into the assembly of Spain on December 10, Martinez Barrios, minister of communications, asked the cortes to declare the contract of August 1924, with the Spanish National Telephone Co., a subsidiary of the International Telephone & Telegraph Corp., illegal and null and its services confiscated after a just "indemnization" to be proposed by the minister of communications within six months.

The contract calls for a forfeit of 600,000,000 gold pesetas [about $115,800,000] in the event the state goes back on the contract. By declaring the contract illegal and thus void, the government expects to get around this.

Although the grounds for the declaration of illegality are not given, Finance Minister Indalecio Prieto, in a speech some time ago, mentioned the names of two men now dead—the late Dictator Primo de Rivera and the late American ambassador, Alexander Moore—as having made an illegal arrangement.

The company was capitalized at 750,000,000 pesetas [about $144,750,000], of which 400,000,000 pesetas [about $78,000,000] represents American investments, and a value of $160,000,000 is set on the company's property. It is expected that in attempting to take over the company's material, the Spanish state will encounter serious obstacles as the rights for the automatic system are in American hands which, it is said, will not sell but will demand that the instruments be taken out.

The company was seriously affected on December 1 when the Spanish Cabinet granted support to a workers' contract drawn up under the supervision of the Ministry of Communications.

The contract provides for increases of 16,000,000 pesetas (about $1,280,000) to an annual payroll of about 25,000,000 pesetas (about $2,000,000) for 7,000 employes and for removing control of the personnel from the company to a board of arbitration made up of one official and two workmen who would hold the final decision over all labor changes.

Company officials said the government's action permits only two courses for the protection of their interests; an appeal for diplomatic intervention by the United States Ambassador, or to refuse to abide by the new contract, thus throwing the responsibility on the government.

Measurements with Voltmeters and Ammeters.

The following laboratory experiments in connection with the theory and use of electrical testing instruments may be performed, where testing instruments are available, to familiarize oneself with instrument theory and use.

Measurement of Resistance in Direct Current Circuits by Voltmeter-Ammeter Method. Purpose of experiment: To illustrate the method of measuring the value of unknown resistances in direct current circuits using a voltmeter and ammeter.

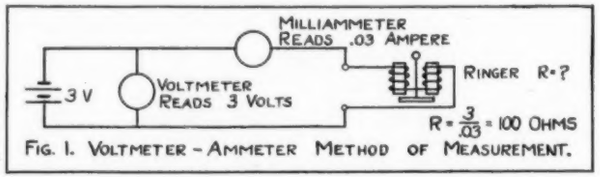


Fig. 1. Voltmeter-Ammeter Method of Measurement.

Equipment required: Direct current voltmeter, direct current milliammeter, battery, unknown resistance. The circuit is set up as shown in Fig. 1.

Computation: The unknown resistance is equal to the voltage across its terminals divided by the current through it, i. e., $R = \frac{E}{I}$.

Caution: (a) Care should be taken to avoid placing the milliammeter across the circuit, or short-circuiting the unknown resistance, as this would result in a serious overload on this meter. (b) The voltmeter should always be placed across the circuit next to the battery, otherwise the current taken by this meter will result in an inaccurate computation.

Measurement of Resistance in Direct Current Circuits by Drop of Potential Method. Purpose of experiment: To illustrate the method of measuring the value of unknown resistances in direct current circuits by the drop of potential method using a voltmeter and a standard resistance.

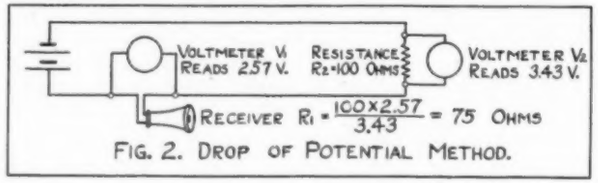


Fig. 2. Drop of Potential Method.

Equipment required: Direct current voltmeter, standard resistance, battery, unknown resistance. The circuit is set up as shown in Fig. 2.

Computation: The unknown resistance is to the standard resistance as the voltage across the standard is to the voltage across the telephone receiver. That is:

$$R_1 : R_2 :: V_1 : V_2 \text{ or } R_1 = \frac{R_2 V_1}{V_2}$$

Caution: A high resistance voltmeter drawing about 1.0 milliampere for full scale deflection should be used. An appreciable error will be introduced if the current required to operate the voltmeter is more than a few milliamperes, especially when measuring high resistance equipment.

Measurement of Resistance in Direct Current Circuits by Voltmeter Battery Method. Purpose of experiment: To illustrate the method of measuring the value of an unknown resistance using a voltmeter and battery in series with the unknown resistance.

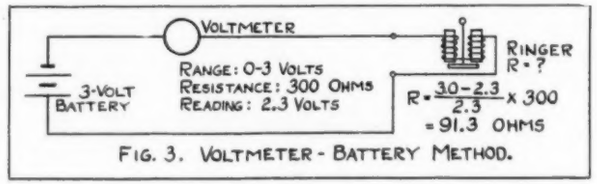


Fig. 3. Voltmeter-Battery Method.

Equipment required: Battery, voltmeter, unknown resistance to be measured. The circuit is set up as shown in Fig. 3.

Computation: To find the value of the unknown resistance, subtract the voltmeter reading from the voltage of the testing battery and divide this result by the voltmeter reading. Multiply the quotient by the resistance of the voltmeter, i. e.:

$$R_1 = \frac{E-V}{V} R$$

where E = voltage of testing battery, V = voltmeter deflection, and R = voltmeter resistance.

Measurement of Resistance in Alternating Current Circuits Containing Non-Reactive Load. Purpose of experiment: To illustrate the fact that Ohm's law may be used without reservations on alternating current only when a non-inductive resistance is considered.

Equipment required: One alternating current ammeter, one alternating current voltmeter, non-inductive load, 110-volt alternating current source. The circuit is set up as shown in Fig. 4.

Note: This method should be studied carefully so that it will be thoroughly understood, as practically all test board measurements utilize this principle. Using the equation given a chart can be worked out for the wire chief's voltmeter to convert volts to ohms.

Computation: The unknown resistance is equal to the voltage divided by the currient, i. e.:

$$R = \frac{E}{I}$$

Caution: The ammeter should never be placed across the circuit as this will burn it out. The voltmeter should always be placed on the line side of the ammeter as shown; otherwise an error will be introduced by the current taken by this meter.

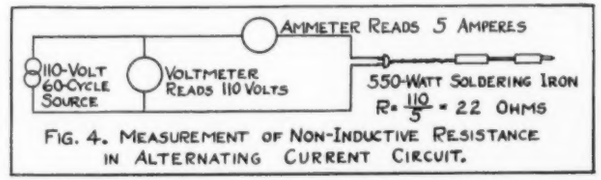


Fig. 4. Measurement of Non-Inductive Resistance in Alternating Current Circuit.

Measurement of Resistance in Alternating Current Circuits Containing an Inductive Load. Purpose of experiment: To demonstrate that the ohmic resistance of an inductive load cannot be obtained by alternating current measurements.

Equipment required: One alternating current voltmeter, one alternating current ammeter, inductive load (either capacitance or inductance), and 110-volt, 60-cycle source. The circuit is set up as shown in Fig. 5.

Computation: The ohmic resistance of the condenser which is infinite cannot be found by simple ammeter-voltmeter measurements because of the reactive characteristics of a capacity connected in an alternating current circuit. The impedance which the condenser offers can, however, be obtained by Ohm's law in the same manner as for direct current circuits.

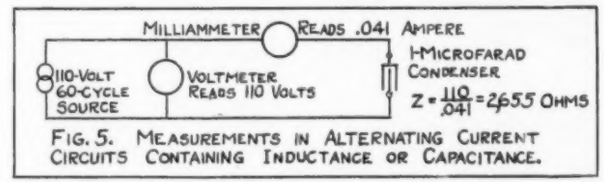


Fig. 5. Measurements in Alternating Current Circuits Containing Inductance or Capacitance.

Caution: Never connect the ammeter across the circuit, and be sure the condenser is not short-circuited; otherwise the instrument would be damaged by excessive current flow.

In dealing with Ohm's law as applied to alternating current circuits the total opposition offered to the flow of current is referred to as impedance and is expressed as Z. The impedance depends on the resistance and reactance of the circuit.

News Facts Education Assistance

THERE are suggestions for improvements — problems solved —ideas for increasing revenue—all capably and interestingly written in every issue of TELEPHONY.

TELEPHONY covers all branches of the business, presenting information of value regarding management, operation, construction, engineering, commercial, traffic, maintenance, financing, manufacturing, commission orders, rate cases—in fact all phases of the industry.

In the past few years there have been many new developments in operating methods, and organizations, to say nothing of technical developments. All these have been faithfully and accurately described in TELEPHONY. Technical developments are presented in a simple, understandable way.

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Telephony

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MANUFACTURERS' LITERATURE

The following is a brief description of recently published bulletins, catalogs, etc. If you are interested in obtaining copies address your request to the manufacturer.

Notices Not Previously Published

TRANSMITTER BATTERY POWER UNIT

New bulletin TC-39 describing the new type CAB-4 combination storage battery and trickle charger power unit for magneto operator's transmitter battery, and its use. **Fansteel Products Company, Inc., North Chicago, Illinois.**

TREE TRIMMING EQUIPMENT

Bulletin Number 18—12 pages—describing and illustrating various tree trimming tools specially constructed for line work. **Bartlett Manufacturing Co., 3003 East Grand Blvd., Detroit, Mich.**

Notices Previously Published

CLIMBERS

16-page booklet illustrating and describing climbers, straps, pads, tool belts and safety straps for linemen. **W. H. Buckingham, 503 State Street, Binghamton, N. Y.**

MAGNETO EQUIPMENT

New 72-page general catalog prepared expressly for magneto exchanges. It completely covers all necessary equipment, apparatus, and supplies for magneto plants. **Kellogg Switchboard & Supply Company, 1066 West Adams Street, Chicago, Ill.**

POLES

A 16-page illustrated booklet entitled, "Termites—A Growing Menace to Untreated Timber." **Ayer & Lord Tie Company, Railway Exchange Bldg., Chicago, Ill.**

POLES

"Handbook of Practical Information About Cedar Poles and Butt-treating," is the title of a 40-page, illustrated book now available. **Page & Hill Company, Minneapolis, Minn.**

POLE SPECIFICATIONS

A 16-page pamphlet containing complete specifications for Southern Yellow Pine poles as prepared and approved by American Standards Association. Supplemented by one 4-page folder containing information relative to the basis on which the new specifications were prepared, and another 6-page bulletin giving a graphic comparison of the existing specifications against the specification proposed by the American Standards Association.

RINGING CONVERTERS

Bulletin No. 150 entitled "Leich Ringing Converters" describes and illustrates converter equipment for producing ringing current; this includes harmonic converters, ringing frequency converters and ringing converters with charger equipment. Leich Electric Co., Genoa, Ill.

SALES CAMPAIGNS

Two Small Folders specially designed for extension sales campaigns are now available. They will be furnished complimentary all ready for insertion with your monthly bills—they can be obtained in any quantity required. **American Electric Company, Incorporated, State & 64th Streets, Chicago, Illinois.**

WOOD PRESERVATIVE

An eight-page booklet entitled, "ZMA for Wood Preserving," regarding the different uses of ZMA wood preservative. **Curtin-Howe Corporation, 405 Lexington Ave., New York City, N. Y.**

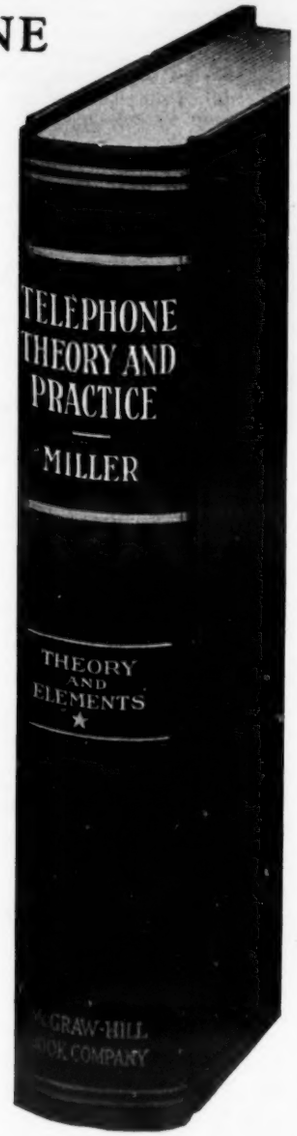
When writing please mention TELEPHONY

TELEPHONE THEORY and PRACTICE

Theory and Elements

by **Kempster B. Miller**

Fellow, American Institute of Electrical Engineers; Member, Western Society of Engineers; Author of American Telephone Practice, 1904, and Joint Author of Telephony, 1912.



Here is a book that comprehensively covers those introductory and theoretical elements of telephony needed for study and reference by workers in all stages of the profession. It is written by an authority; a man connected with practical telephony for more than thirty-five years. Although the first volume of a three-volume series, this book, Theory and Elements, represents an independent, complete and up-to-date treatment of its subject. A thorough groundwork in the background and principles of telephony is given, which will serve:

1. **The rank-and-file telephone worker as a preparation for an understanding of the practical phases of his job.**
2. **The more advanced telephone worker who is specializing in some particular phase of the industry and who may wish to see more clearly how his job is related to the rest of the business.**
3. **The general technical reader who is interested in the broad phases and general workings of the industry.**
4. **The college student who is interested in underlying theory.**

Throughout, the book is written in understandable language, with mathematical applications reduced to a negligible minimum. We recommend this book of great interest and value to every telephone man. 492 pages, 6x9; 272 illustrations; $5.00.

Telephony Publishing Corporation

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608 South Dearborn Street Chicago

With the Manufacturers and Jobbers

New Names for Companies of Associated-General Group.

Announcement has been made by Associated Telephone & Telegraph Co. of changes in names of three of its subsidiaries, which were effective December 1, 1931.

The name of Automatic Electric Inc., manufacturer of Strowger automatic systems, has been changed to Automatic Electric Co., with general offices at 1033 West Van Buren street, Chicago, as before.

American Electric Co., Inc., manufacturer and supplier of manual telephone equipment and telephone construction material and supplies, etc., now becomes American Electric Co. This organization recently moved into new and extensive manufacturing quarters at 6126 South La Salle street, Chicago.

Automatic Electric Sales Co., Ltd., is the new name for the export distributing company for the group, the former name being The Automatic Electric Co., Ltd. The address of this company, 1027 West Van Buren street, Chicago, remains the same.

These changes are the first steps in a program of harmonizing the corporate names of the various manufacturing and sales units of the Associated-General telephone group so as to more readily indicate the scope and functions of each company.

It is suggested that all telephone companies and others having dealings with any of these companies change their records accordingly, and that the new names be employed in forwarding correspondence, orders, remittances, etc.

Elizaville (Ind.) Orders New American Electric Switchboard.

Cort Williams, president of the Elizaville Telephone Co., has announced the purchase of an American Electric switchboard for the company's exchange at Elizaville, Ind.

The new unit is a standard monotype magneto board with a capacity of 150 lines and equipped with 80 line circuits. Code ringing is to be used and two of the 12 cord circuits are to be of the "zero loss" type for toll service.

The switchboard is scheduled for shipment on December 24 and it is expected that it will be installed early in January.

A New Combined Rental and Toll Statement Form.

The Fort Wayne Printing Co., Fort Wayne, Ind., a large mid-western retail telephone supply house, announces the introduction of a new combined rental and toll statement.

Although there are many combined rental and toll statements on the market, the Fort Wayne Printing Co. believes that this new statement form will revolutionize the manner of issuing statements by all Independent telephone companies and will help put aside old and antiquated billing forms.

This new form, which is listed as form T-40 combined rental and toll statement, is said to embody all features necessary to list rentals and tolls intelligently. It eliminates, it is stated, the necessity of keeping a separate record and issuing a separate bill for tolls.

The operation of this new form is very simple. Just fold at the perforation, insert a piece of carbon paper between the two forms, then fill in the various charges; reverse the carbon and turn over and fill in the tolls on back. Both statements are mailed to the subscribers. When payment is made both are stamped "paid." The original is kept for the company records and the duplicate given to the subscriber as a receipt.

The new form is made in convenient size—3⅜ ins. by 12½ ins.—printed with the telephone company's name, city and state at top on heavy 20-pound white bond paper. Used in conjunction with the statements the Fort Wayne company also furnishes size 6¾-inch window envelopes for mailing the forms.

The company also announced the fact that it has manufactured a large supply of the new In and Out toll tickets as prescribed by the Bell company. From the very beginning of the issue of the new forms, the company has been literally "swamped" with orders for the new toll tickets, it is stated.

Complete information regarding the new rental and toll statements may be obtained upon application to the Fort Wayne Printing Co., Fort Wayne, Ind.

Descriptive Booklet on Termite Damage and Prevention Published.

"Termites—A Growing Menace to Untreated Timber" is the title of a booklet published by the Ayer & Lord Tie Co. Termites are the common "white ants," so-called because they are shaped like ants and are white in color.

These harmless appearing insects attack wooden structures and eat thousands of channels through the timbers, thus render-

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ing them almost worthless and requiring replacement, with consequent loss to the owner. Government entomologists, according to the booklet, have discovered that these insects cause loss to owners of untreated timber structures of almost $45,000,000 annually.

What these insects do is described in the first half of the booklet with a number of interesting illustrations. The last half is devoted to the types of structures for which treated timber may be used. Actual photographs of the applications of treated timber in almost every field add to the value of the booklet.

Copies of the booklet as well as other information regarding Ayer & Lord Tie Co. products may be obtained by addressing the company in the Railway Exchange building, Chicago, Ill.

Nebraska November Storms Damage to Lincoln Company Plant.

M. T. Caster, plant superintendent to the Lincoln Telephone & Telegraph Co., Lincoln, Neb., estimates that damage from the November storm will exceed first guesses when the money loss was put at $50,000. Not until permanent repairs replace the temporary ones made will it be accurately known.

A total of ten construction and 18 local crews of the Lincoln company worked unceasingly at restoring service, and little complaint was heard on delay in getting wires and lines in working order.

Much of the damage was to long distance lines and rural drops, but many poles were also found down in the town areas.

The storm covered the southwestern section of the company's territory, extending from Cedar Bluffs in Saunders county to Hebron and Chester in Thayer counties. The greatest damage was in the central part, in York, Butler, Polk, Seward and Fillmore counties.

Orders Stromberg-Carlson Lamp-Signal Magneto Board.

The Kittanning Telephone Co., of Kittanning, Pa., has purchased a lamp-signal magneto switchboard from the Stromberg-Carlson Telephone Mfg. Co. for its Rural Valley, Pa., exchange. The new board will be equipped with 100 lines.

Prices in the Metal Markets.

New York, December 14: Copper—Dull; electrolytic spot and future, 6½@6¾c. Tin—Firm; spot and nearby, $21.62; future, $22.00. Iron—Steady; No. 2, f. o. b. eastern Pennsylvania, $14.50@16.00; No. 2, f. o. b. Buffalo, $14.50@15.00; No. 2, f. o. b. Alabama, $11.00@13.00. Lead—Easier; spot, New York, 3.75c; East St. Louis, 3.55c. Zinc—Quiet; East St. Louis spot and future, 3.15—3.17c. Antimony—Spot, 6.25c. Quicksilver—$66.00@68.00.

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The regular quarterly dividends of $1.75 per share on the 7% First Preferred Stock, $1.00 per share on the Participating Preferred Stock, and dividends on the Class A Common Stock, payable either in stock at the rate of 1/50th of one share or in cash at the rate of 50c per share, will be paid on January 15 1932, to stockholders of record on December 21, 1931 at 3:00 o'clock P. M.
V. E. CHANEY,
Vice-President and Treasurer.

THEODORE GARY AND COMPANY
KANSAS CITY, MISSOURI
Ninety-Fourth Consecutive Quarterly Dividend
The regular quarterly dividend for quarter ending December 31, 1931 of 40c per share on the No Par Preferred Stock has been declared payable January 1, 1932 to stockholders of record as of the 16th day of December, 1931 at 3 P. M. The usual dividend on the Common Stock has been declared payable January 1, 1932 to stockholders of record as of the 31st day of December, 1931.
(Signed) C. A. BENNETT,
Senior Vice-Pres. and Treas.
December 7, 1931

WHAT THE COURTS AND COMMISSIONS ARE DOING.

(*Concluded from page 34.*)

Everett exchange at midnight, November 30, the company returning to the flat-rate schedule of charging for telephone service.

Summary of Commission Rulings and Schedule of Hearings.

CALIFORNIA.

December 7: Extension granted from December 31, 1931, to February 28, 1932. for transfer of properties of Ontario & Upland Telephone Co., Pomona Valley Telephone & Telegraph Union, and Home Telephone & Telegraph Co. of Chino to the Associated Telephone Co., Ltd.

ILLINOIS.

December 15: Hearing in Chicago before Commissioner Brinkman on complaint of Roy Burgett, et al., vs. the Milford Telephone Co., relative to unsatisfactory service in Milford and vicinity.

December 15: Hearing in Chicago before Commissioner Collins on application of the Milford Telephone Exchange Co. for a certificate of convenience and necessity to construct and operate a certain rural telephone line or lines extending southwest from Milford, Iroquois county.

December 17: Hearing in Chicago before Commissioner Gilbert on application of the Western Illinois Telephone Co. asking for an order authorizing the issue of additional first mortgage bonds in the amount of $21,600.

KANSAS.

November 17: Application of subscribers of the Clyde exchange of the American Telephone Co., of Abilene, for a reduction of rates on rural party line telephones from $1.50 to $1.00 and city rates in proportion denied.

November 30: The American Telephone Co. authorized to discontinue exchange at Doniphan and to connect subscribers to exchange at Troy.

November 30: The American Telephone Co. authorized to discontinue exchange at McFarland and to connect subscribers to exchange at Alma.

November 30: Permission to discontinue the Summerfield Mutual Telephone Co.'s so-called "free toll line" between Summerfield and O'Keto denied.

MINNESOTA.

December 7: Approval granted joint application of the Farmers Telephone Co. asking for permission to sell and the Howato Telephone Co., to purchase certain telephone properties located in the township of Stockholm, county of Wright.

December 10: The Northwestern Bell Telephone Co. ordered to discontinue its public toll pay station service at Round Prairie, and remove all equipment necessarily installed therefor.

December 21: Hearing postponed from December 2 on petition of O. B. Sillerud, et al., filed April 8, and the petition of Alexander Small, et al., filed May 23, requesting an investigation as to the reasonableness of the present rates of $21.00 per year gross, or $18.00 net, for rural metallic circuit telephones, and $18.00 per year gross, or $15.00 net, for rural grounded circuit telephones as charged by the Pelican Telephone Co.

December 29: Hearing in which the Leslie Rural Co-operative Telephone Association is cited to show cause why it should not provide public toll pay station service at Round Prairie.

MISSOURI.

December 11: Application filed by the Scotia Telephone Co. asking for authority to file new schedule of rates for service at Union, Franklin county.

December 11: Application filed by the Citizens Public Service Co. of Missouri, asking for permission to abandon its grounded toll line between Troy and Moscow Mills, Lincoln county.

December 18: Hearing in Jefferson City on application of the Clinton County Telephone Co. for authority to issue $70,000 of its first mortgage bonds.

NEBRASKA.

December 10: Application filed by the Northwestern Bell Telephone Co. for authority to cancel certain special rates for excess line mileage and to discontinue the offering of inward line service at its Sidney exchange, where the base rate area has recently been enlarged.

December 10: Application filed by the Northwestern Bell Telephone Co. for authority to extend its south general zone at Omaha to include rural subscribers to Ralston and Bellevue exchanges.

December 12: Application of the Hamilton County Farmers Telephone Association for authority to publish a rate of 65 cents a month for extension bells under another roof in addition to the regular rate of 25 cents a month for extension bell service, found reasonable and granted.

NEW JERSEY.

December 1: The New Jersey Bell Telephone Co. filed a new schedule of rates for Newark, Irvington, the Oranges, and Maplewood to take effect May 29, 1932, when dial operation goes into effect.

OHIO.

December 4: Northern Ohio Telephone Co., of Bellevue, authorized to file new schedules for the college towns, Delaware, Oberlin and Bowling Green, establishing a rate of $12 a year for coin-box collections for long distance calls.

December 4: Application filed by the Leroy Township Telephone Co. asking for an increase in the rate for telephone rental service from $12 per year to $19.

The application was signed by J. H. Harrison, president, and Bernice Crellin, secretary.

December 8: Authorization given the Ohio Cities Telephone Co., of New Philadelphia, to purchase the Ohio Associated Telephone Co., of Marion, and the Freeport Telephone Co., of Freeport.

SOUTH CAROLINA.

November 27: Action to secure lower rates from the Southern Bell Telephone & Telegraph Co. for west shore of Ashley river at Charleston rescinded.

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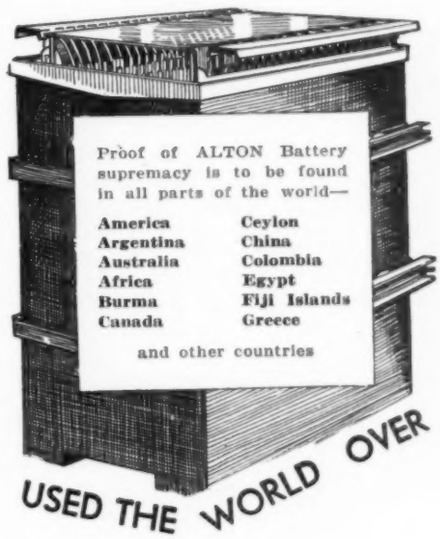

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Western Elec. No. 329 Transmitters with back and mouthpiece @	1.25
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Stromberg-Carlson inside cord connection 4-bar 1000-1600 or 2500 ohm desk set signal set with Ind. Coil @	5.50
Kellogg No. 546 Polarized Burglar Alarm Relays @	1.65
Kellogg 24-volt Swbd. Lamps, per 100	5.00

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POSITION WANTED—As repairman, mgr. or combination man. 10 years' experience. Married. Take any position, any place. Address Wm. Asson, Box 73, New Egypt, N. J.

PERMANENT POSITION WANTED By all 'round magneto telephone man; 15 years' experience switchboard, construction, trouble work; 5 years with Bell Co.; reference last employer. Address 8089, care of TELEPHONY.

POSITION WANTED—By first-class cable splicer and all-around telephone man. References from last employer. Address 8092, care of TELEPHONY.

FOR SALE

FOR SALE—40,000 exchange line and old type toll glass insulators packed in barrels of 350 per barrel ready for shipment. Price $2.90 per hundred F. O. B Lincoln, Nebraska. Lincoln Telephone & Telegraph Company, F. M. Strasser, Supervisor of Supplies.

FOR SALE

Two-ton, Four-Wheel Drive Truck, equipped with Model C derrick, double drum highway winch and line construction body. Address 8097, care of TELEPHONY.

FOR SALE—60 or more Western Electric No. 1317 telephone sets, in good shape at attractive price. Address 8101, care of TELEPHONY.

FOR SALE—Kellogg 4-position full feature common battery switchboard in A1 condition. One of the four positions in use only 8 months. Board can be seen in service in our Martinsville exchange. Will be released within 90 days. Lee Telephone Company, Martinsville, Virginia.

WANTED

WANTED—Competent, reliable, telephone man, now supt. of telephone system, desires to lease, with option to purchase, telephone exchange or system, fifty to five hundred subscribers. Exceptional references. Address 8098, care of TELEPHONY.